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THEORY OF THE INVERSE CARRYING CHARGE IN FUTURES MARKETS

HOLBROOK WORKING
Food Research Institute, Stanford University

IN THE technical language of American futures markets, *carrying charge* refers to a difference at a given time between prices of a commodity for two different dates of delivery.[1] If prices of Chicago wheat futures, for example, were quoted as, September, $1.30, December, $1.38, and May, $1.48, it would be said that the market showed a carrying charge of eight cents from September to December, of ten cents from December to May, and of eighteen cents from September to May.

Carrying charges in the futures market sometimes approximate, or even exceed, the cost of holding the wheat in public storage at the regular rates (*storage charges*) fixed by the grain exchanges for such service, but more often they are less. Not infrequently prices of the deferred futures are below that of the near future; the market is then said to show an *inverse carrying charge*, or sometimes an "inverted," or a "reversed" carrying charge. In British usage, "contango" and "backwardation" refer to positive and inverse carrying charges respectively.

There seems to be substantial agreement among writers on futures markets that positive carrying charges tend to reflect marginal net costs of storage, and that when carrying charges are positive, prices of near and distant futures must respond about equally

[1] "Carrying charge," like most other economic terms, is used in varying senses. The Federal Trade Commission in its valuable *Report on the Grain Trade*, uses "carrying charge" only in the sense of carrying costs, treated usually as comprising commercial charges for interest, insurance, and storage in public elevators. (*Op. cit.*, VI [1924], 147, 192 ff.) What are here called carrying charges it refers to always as spreads.

to any causes of price change. With regard to inverse carrying charges there is more difference of opinion and much reason for the student of futures markets to be dissatisfied with the present state of theory. How shall one explain a large inverse carrying charge between December and May in a United States wheat market? Do inverse carrying charges reliably forecast price declines? When prices of deferred futures fall below the spot price, does the futures market tend to lose effective connection with the cash[2] market? These are some specific questions that call for answer and to which no satisfactory reply seems to be offered by prevailing theory.

Other questions may be suggested by attempts to explain price relations shown in the table below, which records the wheat price structure in Chicago or in Kansas City early in September and early in the following May of each of four crop years selected with a view to exhibiting a variety of conditions, ranging from that of large positive carrying charges in the column at the left to large inverse carrying charges at the right.

Four different lines of attempt to explain inverse carrying charges and other market conditions which accompany them will be considered in the present paper, as follows:

(1) "Cash and futures prices, though related, are not equivalents aside from the time element, at least in the United States wheat market."

(2) "The future, as against the present, is discounted."

(3) Expectations regarding future demand and supply conditions tend to have more effect on prices of deferred futures than on cash prices or on near futures.

(4) An inverse carrying charge is a true negative price of storage, arising from the fact that stocks may have a high marginal "convenience yield."

The first two of these are quoted from a note by Lawrence L. Vance in this *Journal*,[3] not because they are original with him—others have expressed similar views before—but in recognition of his perception of the importance of inverse carrying charges for the theory of futures markets and his attempt to relate theory to the

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[2] The adjectives "cash" and "spot" are often used with the same meaning, but cash has also the sense of "not-future"; the official rules of the Chicago Board of Trade include the definition, "Cash Grain.—Spot grain and grain to arrive." In this paper I intend "spot" to designate that cash price which applies to the particular description of the commodity which is expected to be delivered on the future to which its price is related in calculation of the carrying charge; other spot prices I designate as "cash." Thus in Table 1 the adjective is "cash" because the quotations probably do not represent quite the quality to which futures quotations apply.

[3] November 1946, XVIII, 1036–40.

TABLE 1. TEMPORAL PRICE STRUCTURE OF CHICAGO WHEAT MARKET ON SELECTED DATES*

Quotation	Sept. 5, 1929[a]		Sept. 1, 1934		Sept. 1, 1925		Sept. 3, 1946[b]	
	Price	Difference	Price	Difference	Price	Difference	Price	Difference
"Cash" wheat	126 7/8		103 3/8		156		194	
Sept. future	132 1/8	(+5 1/4)	102 5/8	(− 3/4)	154	(− 2)	191 3/8	(− 2 5/8)
Dec. future	140 3/8	+8 1/4	103 5/8	+1	152 5/8	− 1 3/8	189 3/4	− 1 5/8
May future	150	+9 5/8	105	+1 3/8	157 1/8	+ 4 1/2	183 1/2	− 6 1/4
	May 1, 1930		May 1, 1935		May 1, 1926		May 1, 1947[b]	
	Price	Difference	Price	Difference	Price	Difference	Price	Difference
"Cash" wheat	98 1/2		98 3/4		166 1/4		267	
May future	101 1/2	(+3)	97 3/4	(−1)	164 1/4	(− 2)	258	(− 9)
July future	104 1/2	+2 3/4	98 1/2	+3/8	143 3/8	−20 7/8	219 7/8	−38 1/2
Sept. future	107 5/8	+3 5/8	98 3/4	+5/8	137 5/8	− 5 3/4	213	− 6 7/8
Dec. future	112 5/8	+4 1/4	—		—		210 1/2	− 2 1/2

* Based on closing quotations on the first trading day of the month indicated. The cash quotations apply as nearly as possible to wheat of the quality and location that will be delivered on the near future, but the correspondence may not be exact in any instance. The "differences" are in each instance differences between the specified futures price and the cash or future price immediately above it; those between futures are pure carrying charges, while those between cash and futures prices, shown in parentheses, may include a quality or location differential.

[a] The third trading day, taken because quotations on the first trading day and a few neighboring ones were unrepresentative of the price structure that prevailed through most of August and September.

[b] Kansas City quotations are used for 1946–47 in order to show the September price structure in terms of quotations for the same delivery months as in other years; trading in Chicago in the autumn of 1946 was for October and January delivery. The price structure at Kansas City was essentially the same as at Chicago throughout 1946–47, as it usually is.

observable facts. Inverse carrying charges, as Vance has said, are not adequately explained by conventional theories of futures markets. Because they occur frequently and are often larger than any positive carrying charges that ever arise, they cannot be regarded merely as the effects of special influences which do not warrant attention in a general realistic theory of futures markets.

Two Markets Or One?

The suggestion that cash and futures prices are not equivalents apart from the time element may be taken either narrowly or broadly. On a narrow interpretation, which seems what Vance intended, it may imply only that cash and futures prices differ for

such reasons as differences in quality or location of the commodity or because of uncertainty as to time of delivery on futures contracts.

It appears to me illogical to treat differences in quality or in location as explanations of carrying charges, either positive or inverse, except under extraordinary circumstances. In general a carrying charge, defined as a market difference between prices of a commodity for different dates of delivery, should be a difference between prices for essentially the same quality, in the same location, at the different dates. Most cash price quotations on grades of wheat deliverable on futures contracts in American markets apply to a quality superior to that which will be delivered on the futures contracts. Cash-future price differences therefore usually reflect quality differentials as well as time differentials. But in such cases it should be said that the price difference is a combination of carrying charge and quality differential, not a pure carrying charge.

Chicago cash wheat price quotations which seemed to provide a nearly perfect basis for calculating the market carrying charge were available until 1917.[4] Now, published cash price quotations in terminal markets apply almost invariably to wheat on track rather than to wheat in store. Therefore cash-future price differences commonly include a location differential, which may amount to a cent or two per bushel, the price on track being below the price in store when the prevailing movement is into storage.

In such an extreme case as is presented by the quotations for September 5, 1929, a price on track may properly be used for calculating a market carrying charge. Wheat on track sold then more than five cents under the price of the September future (which may be regarded as also a spot price, since large deliveries were being made on futures contracts) because elevator space was lacking for all the wheat arriving; two different sets of carrying charges existed simultaneously, one for wheat in store in "regular" elevators and another, not exactly determinate,[5] for wheat "without a home."

Concerning the effect of uncertainty regarding the time when delivery will be made on futures contracts, two facts should be noted: (a) there usually is little or no doubt among interested

[4] Holbrook Working, "Price of Cash Wheat and Futures at Chicago since 1883," *Wheat Studies of the Food Research Institute* [hereafter referred to as *Wheat Studies*], November 1934, XI, 79. Later references to works by the present writer omit designation of authorship.

[5] The length of time that the wheat might have to be held before it could be sold at a parity with wheat in store was uncertain.

traders regarding the approximate time when delivery may be expected;[6] and (b) the actual or potential volume of buying of futures by people for whom precise timing of delivery is important is so small that it may be ignored as a price factor.

Taken more broadly, the question whether cash and futures markets are equivalent apart from the time element includes the question whether cash and futures prices may differ because they reflect the opinions of substantially different groups of traders. The view that persistent differences arise for that reason requires the supposition that arbitrage between the cash and futures prices may be ineffective. The prevalent opinion of recent theoretical writers seems to be that "arbitrage can always be relied upon to prevent the forward price from exceeding the spot price by more than net carrying cost . . . [but] cannot be equally effective in preventing the forward price from exceeding the spot price by *less* than net carrying cost. In fact, it is possible that the forward price may not exceed the spot price at all or even fall short of the spot price (even when net carrying cost is positive)."[7] "There is no limit . . . to the extent to which the futures price may *fall short* of the current [spot] price."[8]

This theory of inverse carrying charges is clearly inapplicable to wheat prices in the United States and may be quite generally untenable. It rests in part on the mistaken assumption that hedging is not arbitrage. The placing of a hedge against a purchase of cash wheat is one part of a double transaction which is arbitrage in fact as well as in form because its occurrence depends on a judgment regarding the relation between two prices. Sometimes the judgment

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[6] Deliveries on futures tend to be concentrated either early in the delivery period or late, and traders usually can judge well in advance which to expect. Occasionally such expectations prove mistaken, but even then uncertainty is short-lived; one expectation is quickly replaced by another on the basis of events in the first few days of the delivery period.

[7] Gerda Blau, "Some Aspects of the Theory of Futures Trading," *Review of Economic Studies*, 1944–45, XII, 11. The above quotation in the context I have given it reflects Miss Blau's views correctly, I think, though incompletely. Elsewhere she says that "arbitrage can always be relied [upon] to keep prices in the cash market and in the futures market in line" (*loc. cit.*, p. 23); but by this she means, to keep the "cash spot" price in line with the "futures spot" price. More fully expressed, the statement quoted in the text above would read in part, "arbitrage . . . cannot be equally effective in preventing the [futures] forward price from exceeding the [futures] spot price by *less* than net carrying cost." It follows that she does not regard arbitrage as reliably effective between the "futures forward" price and the "cash spot" price.

[8] Nicholas Kaldor, "A Symposium on the Theory of the Forward Market," *Review of Economic Studies*, 1939–40, VII, 198.

takes the form of a decision to hedge a cash transaction that would be made in any event, but more commonly in United States terminal wheat markets the occurrence of the cash transaction (and, therefore, of the futures transaction also) turns on a judgment that the relation between the cash and the futures prices warrants the double transaction.[9] Since cash prices may be depressed relative to futures quite as effectively by diminution of purchases as by increase of sales in the cash market against opposite transactions in futures, arbitrage between cash and futures markets for wheat remains effective even in the presence of narrow physical limits on the possible sales of cash against purchases of futures.[10]

This is a conclusion that should not be accepted lightly. It requires the abandonment of a pattern of thought regarding futures markets which is extraordinarily difficult to relinquish; the reader who accepts it will almost certainly soon find himself thinking and speaking, when he tries to discuss a wheat price situation involving inverse carrying charges, as though he still regarded cash and futures prices as substantially independent.

Continuous effectiveness of arbitrage between cash and futures prices makes it necessary in most consideration of price influences to regard the two sets of prices as determined in a single market. To treat them as determined in separate markets is to risk implying a degree of independence that does not exist.

[9] There is this possibly significant difference between pure arbitrage and hedging: the arbitrager, concerned only with trading on price differences, might be expected to initiate a transaction only after prices had departed appreciably from the relation which he believed warranted; the hedger, whose arbitrage is incidental to merchandising or processing, tends to be satisfied to take profits from his major operation and to require of the price relations only that they be such as not to threaten him with loss. Arbitrage associated with merchandising or processing (*i.e.*, hedging) may thus be expected to operate more promptly and strongly than would pure arbitrage against an unwarranted tendency of futures prices to rise relative to cash.

[10] It would not be difficult to produce evidence for several other commodities that hedging provides continuously effective arbitrage between the cash and futures prices, but little would be gained thereby for present purposes; addition of a number of other examples of continuous effectiveness would not exclude the possibility, or greatly reduce the probability, that contrary examples might be found. More profit might be had from a study of the causes of failure of efforts to establish futures markets; there might emerge the conclusion that no futures market can long persist without support from routine hedging. One reason for thinking that such may be the case is that speculative interest, which in some circumstances may provide ample buying and selling orders to support a futures market without any hedging business, tends to dry up when market conditions do not encourage differences of opinion. Merchants and manufacturers whose decisions to hedge or not to hedge turn on specific appraisals of price risks, will then tend also to abandon the futures market. Unless it has a large back-log of business from those who hedge on general principles —perhaps to avoid need for making an appraisal of general price prospects, or because their bankers require it—a futures market must find it difficult to survive such a period.

In primary wheat markets of the United States the prevalaence of hedging by both buyers and sellers and the "breadth" of futures trading (which is, indeed, a requisite for prevalence of hedging) have led to abandonment of even the outward appearance of independence in the cash market.[11] At the cash-grain tables buyers and sellers ordinarily do not discuss prices; they bargain in terms of cents "over" and cents "under." When agreement is reached in these terms the premium or discount settled on is applied to the latest quotation for the "basic" future to arrive at a formal price. The cash market is therefore clearly subsidiary from the standpoint of price formation, as country markets or retail markets are usually subsidiary to large wholesale markets. The function of primary price formation lies with the futures market.[12]

The fact that wheat markets in the United States offer no opportunity for significant inverse carrying charges to develop from a tendency for the cash and futures market to pull apart, does not by itself imply that such tendencies cannot be effective in markets where there is relatively little hedging, if there be such futures markets. But since large inverse carrying charges do occur in American wheat markets for other reasons, it follows that such other reasons may afford the principal or sole explanation of inverse carrying charges in all markets.

Discount on the Future

Although this section takes its title from a statement by Vance, it must consider also an alternative theory advocated by J. M. Keynes, and an idea treated by the Federal Trade Commission

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[11] The same condition existed in Canada when the Winnipeg futures market was functioning.

[12] Bargaining in terms of differences rather than of prices, which is to be observed in markets for several commodities, represents an advanced stage of dependence of one market on another. It is rarely found in country or in retail markets because in them at least one of the parties to each transaction commonly has an active interest in the price and not merely in a price difference.

The practice of trading in terms of price differences has long been recognized in specialized economic literature, though it has received little general attention by economists. The Federal Trade Commission's *Report on the Grain Trade*, III, 1922, 44–46, describing trading at Chicago on August 27, 1918 (the date is not stated but is identifiable from the quotations), indicates that cash sales of oats were being made directly in terms of premiums and discounts while bargaining for corn was directly in terms of prices. Wheat prices were then under governmental control. G. Wright Hoffman, writing ten years later, speaks of spot transactions in grains on terminal markets as being uniformly in terms of premiums and discounts (*Future Trading upon Organized Commodity Markets in the United States* [Philadelphia, 1932], pp. 260–263).

which is common to the theories of both Vance and Keynes but admits of still other theoretical development.

Vance's theory is expressed in two sentences:

> traders have not been willing, at the start of trading in a particular future, to give full effect in their commitments to the forces which existed at the time, and . . . only after the passage of time and the confirmation of what theory would have predicted at the start were prices revised upward. The mere fact that future events always bear some degree of uncertainty is perhaps sufficient to justify a discounting of expectations.[13]

Keynes' explanation of "normal" inverse carrying charges, commonly referred to as his "theory of normal backwardation," ran as follows:

> If supply and demand are balanced, the spot price must exceed the forward price by the amount which the producer is ready to sacrifice in order to "hedge" himself, *i.e.* to avoid the risk of price fluctuations during his production period. Thus in normal conditions the spot price exceeds the forward price, *i.e.* there is backwardation. In other words, the normal supply price on the spot includes remuneration for the risk of price fluctuation during the period of production, whilst the forward price excludes this. The statistics of organized markets show that 10 percent per annum is a modest estimate of the amount of this backwardation in the case of seasonal crops which have a production period approaching a year in length and are exposed to all the chances of the weather. In less organized markets the cost is much higher. . . .[14]

The Federal Trade Commission was content to discuss and try to measure "downward bias" in futures prices.[15] Because both Vance and Keynes relied on supposed statistical proof of existence of downward bias to support their theories, the three theories are closely related. (There is an element of theory in the concept of downward bias, since it assumes the existence of a general tendency measurable by statistical averages.) Vance went further than the Federal Trade Commission by suggesting an explanation of the downward bias, and Keynes, offering a different explanation, gave explicit expression to the relation he conceived to exist between downward bias and "normal" inverse carrying charge.

As an explanation of inverse carrying charges, Vance's theory of discount on the future is difficult to discuss on logical grounds be-

[13] This *Journal*, November 1946, XVIII, 1039.

[14] *Treatise on Money* (New York, 1930), II, 143. The hedgers in wheat and corn markets of the United States are rarely producers, but Keynes' theory may be rendered directly applicable to those markets by substituting "merchant and processor" in place of "producer" in the first sentence quoted above and making a corresponding substitution for "period of production" in the next sentence.

[15] *Cf.* references below.

cause he did not set out the reasoning by which he would connect downward bias and carrying charge. It may hinge on a concept of substantial independence of cash and futures markets such as has been criticized in the foregoing section of this paper. Keynes' theory of normal backwardation has been called in question in later theoretical discussion.[16] That discussion has tended toward the conclusion that the logical expectation depends on what assumptions are made, but it has not produced clear evidence as to what assumptions are appropriate to actual futures markets.

We may as well confine further attention at this point to the statistical evidence. I shall attempt in later pages to show that inverse carrying charges may best be explained by a theory that does not involve explicit consideration of any supposed downward bias of futures prices. The remainder of this section argues that such actual downward bias as may exist cannot contribute significantly to explanation of inverse carrying charges, irrespective of the theory accepted as relating them.

Contrary to Keynes' apparent assumption it is not a simple matter, as we shall see, to determine precisely what "the statistics of organized markets show" with respect to the price tendency he was considering. One of the most critical and painstaking inquiries into the subject was that made by the Federal Trade Commission. It attacked the problem in several different ways. All the methods produced evidence, in price data subsequent to 1896, of some "downward bias" in futures prices of wheat and corn, but not of oats; but for the ten-year period prior to 1896, the indicated bias was in the opposite direction for all grains.[17] The method which the Federal Trade Commission appeared to regard as quantitatively most trustworthy, and the only one from which it drew a value which was discussed as a measure of bias, yielded for wheat, 1906–16, the estimate that it amounted to −2.39 cents (about 2.4 percent) for a twelve-month interval.[18]

An inquiry of mine into the seasonal tendency of wheat futures prices led to the conclusion that I could "find no evidence of a gen-

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[16] Recent literature includes: J. R. Hicks, *Value and Capital* (Oxford, 1939), pp. 135–139; Nicholas Kaldor," Speculation and Economic Stability," *Review of Economic Studies*, 1939–40, VII, 1–27; J. C. R. Dow, "A Theoretical Account of Futures Markets," *ibid.*, 1939–40, VII, 185–195; Nicholas Kaldor, J. C. R. Dow and R. G. Hawtrey, "A Symposium on the Theory of the Futures Market," *ibid.*, 1939–40, VII, 196–205; and Gerda Blau, *ibid.*, 1944–45, XII, 1–30.

[17] *Report on the Grain Trade*, VI (1924), Chapters IX, X and Appendices.

[18] This was stated with a footnote qualification that a slight modification of the procedure, which might be preferred, gave a result of −2.04 cents (*ibid.*, p. 204).

eral tendency toward post-harvest depression of prices of Chicago wheat futures."[19] But I should incline to think that a tendency averaging only 2 percent per year might exist without being capable of statistical proof. Another investigation along different lines led to the conclusion, as a statement of historical fact, that "speculators in wheat futures as a group have in the past carried the risks of price changes on hedged wheat and have received no reward for the service, but paid heavily for the privilege."[20]

With regard to corn futures prices, which Vance cited as showing strong evidence of "discount on the future," some pertinent data are presented in Chart 1. Price averages for the May future, in which trading is usually heaviest and starts farthest in advance of the delivery date, are shown from August to the following May. The record is continued through a 14-month interval by means of averages for the September future.

Section A of Chart 1 gives the results of using prices for 32 of the 33 years on which Vance relied for evidence; data for the September 1918 and May 1919 futures are omitted because quotations on each ran for only a few months and cannot be included without greatly decreasing the number of months for which averages can be calculated. The averages give a strong impression of a general tendency for futures prices to rise from month to month; but is it reasonable to base conclusions regarding a general tendency on price data for 1904–05 to 1936–37, a period dominated by years in which the general price level was rising, and one which included the abnormal price fluctuations during and just after the first world war? When data are added for 20 earlier years, and one later (the last crop-year before onset of the second world war), a considerably smaller tendency for corn futures prices to advance during the crop year is indicated (Section B). Eliminating from the calculations data for seven war and post-war years, when price fluctuations were abnormal and unusually difficult to anticipate, results (Section C) in still further reduction of the indicated price advance. Deflation of the original price series before averaging (Section D) produces little change in the tendencies suggested.[21]

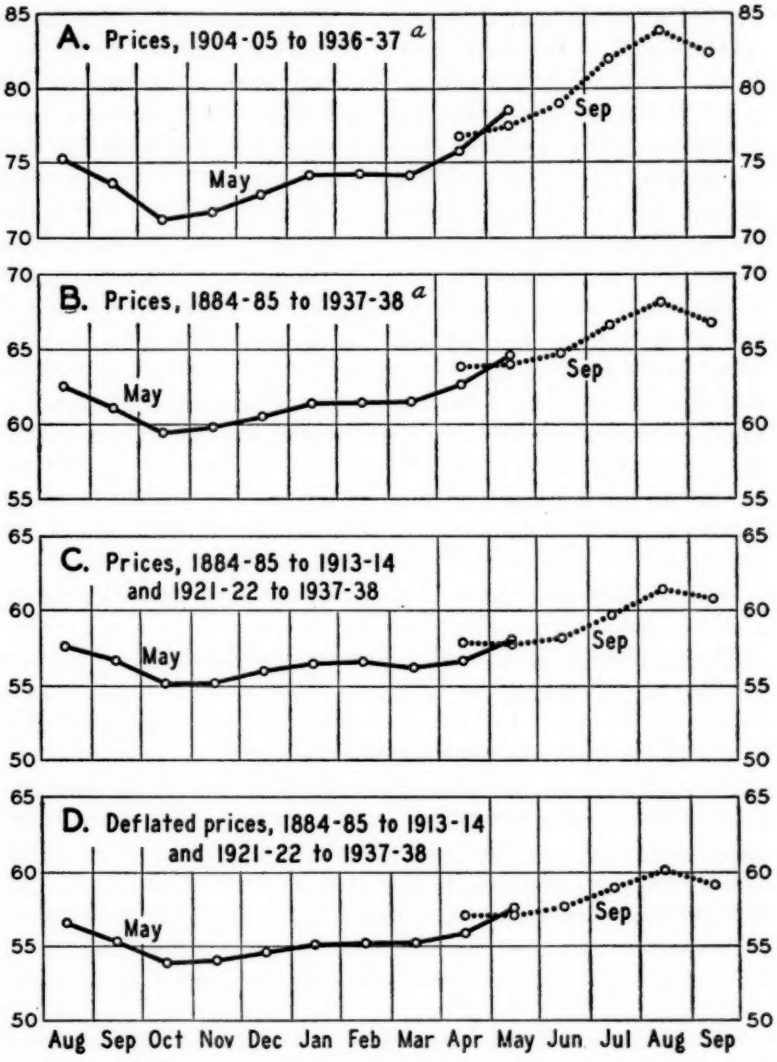
[19] "The Post-Harvest Depression of Wheat Prices," *Wheat Studies*, November 1929, VI, cover page summary.

[20] "Financial Results of Speculative Holding of Wheat," *Wheat Studies*, July 1931, VII, 435.

[21] In the long series beginning with 1884–85, years of declining general price level approximately balance those of rising price level and deflation serves mainly as a weighting device; applied to the series beginning with 1904–05, deflation would also eliminate part of the upward trend found in that period.

CHART 1.—AVERAGE SEASONAL COURSE OF PRICES OF CHICAGO MAY AND SEPTEMBER CORN FUTURES*

(*Cents per bushel*)



* Computed generally from Friday closing prices; when direct closing quotations have not been available, as occasionally happened for the May future in August (and once in September) and for the September future in April and May, approximations based on other quotations have been substituted. Deflated prices are in terms of the 1910–14 price level.

a Omitting prices for the September 1918 and May 1919 futures; see text.

If one takes the data of Sections C and D of Chart 1 as representative of tendencies in corn futures prices in the United States, it appears that on the average prices tended to rise about two cents per bushel between October and April, with the advance concentrated mainly in December and January. A further rise of the May future in the delivery month means little from the present standpoint. It can be attributed to two tendencies other than a discounting of the future, namely: (1) when stocks are large the expiring future tends to be effectively a spot price during the delivery month and for that reason it rises relative to deferred futures during the course of the month; and (2) when stocks are short, the price of the expiring future is sometimes raised relative to other futures and most cash prices by a corner or squeeze—developments which it is neither practically possible nor theoretically desirable to have affect prices in advance.[22] The September future shows an average rise of over 3 cents per bushel between June and August, which must be considered with the nearly equal average decline in the May future from August to October. Shall we say that the September future tends to underestimate price prospects while the May future tends at first to overestimate them, or shall we say that the price averages show a three-month seasonal bulge that culminates in August, perhaps because crop scares occur so frequently in July and August?

The evidence of Section C may be summarized more simply in another way. Prices of the May corn future during 46 years show an average decline of 1.0 cent per bushel between August, the first month in which that future has usually been traded, and the following April; between April and the next August, the September future rose 3.5 cents per bushel, on the average. The total average change over twelve months, therefore, was an increase of 2.5 cents, or slightly over four percent. On this basis, downward bias in Chicago corn futures seems to have averaged rather less than 0.4 percent per month.

More evidence might be offered[23] tending to show that prices in

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[22] The discrepancy between Vance's interpretation of the evidence on corn prices and that presented here rests almost wholly on the selection of years taken as representative, and the treatment of delivery-month prices.

[23] For example, intensive study of Winnipeg wheat prices, directed particularly at measurement of the effects of hedging pressure on futures prices, may be found in "Price Effects of Canadian Wheat Marketing," *Wheat Studies*, October 1937, XIV, 37–68.

major futures markets have little downward bias, but we risk overemphasis on this issue for present purposes, important as it may be from the standpoint of appraising the economic utility of futures trading. Enough has been said to show that no theory founded on downward bias could explain more than a very small inverse carrying charge.

Price Expectations

Views which seem to prevail widely regarding the influence of expectations were expressed in the Federal Trade Commission's *Report on the Grain Trade*. "There may be an active demand for cash wheat, for example," the *Report* says, "at whatever terminal market is under consideration, while the speculators dealing in the more remote futures . . . may believe that prices are bound to go down markedly by the time the futures contracts mature—for example, in May. Anticipations of more abundant supplies or of slackened demand in the spring may press down the price of future contracts almost without limit . . . there is nothing in the machinery and methods of the grain trade to limit the discount, provided there are speculators willing to trade, and specifically short sellers willing to sell, at relatively low prices."[24] Furthermore, "July and September [futures] prices . . . are both much affected by [anticipated] receipts from the new wheat crops, the one of winter and the other of spring wheat, and by the comparatively unsettled conditions and estimates regarding their quantity and movement. . . . Options relating to different crop years may relate to entirely different supply conditions and prices."[25]

Opinions such as these are often qualified by the observation that existence of heavy surplus stocks may force spot and futures prices into a pattern of relationship determined by the costs of carrying stocks. The text from which the foregoing quotations are drawn includes a somewhat obscure phrase which was doubtless intended as such a qualification. I should like in the next few pages to advance first the theory, admittedly oversimplified, that in a perfectly functioning futures market continuous existence of any stocks should prevent the emergence of price differences that depend on expectations, and then to examine whether actual price behavior agrees better with that theory or with the prevalent view.

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[24] Vol. VI (1924), p. 147. Cf. the quotations on p. 5, above from recent writers.
[25] *Ibid.*, p. 204.

Consider first a case in which stocks are heavy and the market shows a strong positive carrying charge, as in the quotations for May 1, 1930, in Table 1. The fact that September wheat (the distant future) was quoted then at nearly six cents per bushel above May wheat (the near future) may be regarded in a sense as recording market expectation of a price advance, but the expectation concerns only the consequences of the existing level of wheat supplies. The prices show a "market expectation" that wheat will be worth about $1.08 per bushel in September, and a consequent opinion that the May value, in view of costs of storage, is about $1.02. Expectations regarding future supply and demand conditions must affect the price of the May future as much as the price of the September.[26]

It should be particularly noted that this discussion avoids a direct answer to the question: Do futures prices reflect expected price change? That query is like the question, Have you stopped beating your wife? To state the facts without false implication, it is necessary to refuse to answer the question as put.

An important merit of futures trading is that it helps to make spot prices conform to expectations regarding events to come.[27] It does so partly by affording those who have opinions on prices a chance to deal in contracts applying to a time that suits their thinking, and partly by the mere fact that it shows where prices should stand later in order to justify present cash prices.

The idea that a futures market *should* quote different prices for different future dates in accordance with developments anticipated between them cannot be valid when stocks must be carried from one date to another. It involves supposing that the market should act as a forecasting agency rather than as a medium for rational price formation when it cannot do both. The business of a futures market, so far as it may differ from that of any other, is to anticipate future developments as best it may and to give them due

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[26] I leave to one side the interesting theoretical question, in what sense any futures price reflects expectations, because it has no significant bearing on the immediate problem here. For an exchange of views on that subject see Kaldor, Dow and Hawtrey, "Symposium," and papers cited therein. My observations accord with the views expressed by Mr. Hawtrey in the "Symposium."

[27] Prices of the current-month future during May 1930 were effectively spot prices because deliveries were heavy from the beginning of the month; the Chicago *Daily Trade Bulletin* reported deliveries of 5,362,000 bushels on September 1. The three-cent discount of cash wheat under the May shown in Table 1 is probably a location differential similar to that observed early in the previous September.

expression in present prices, spot and near futures as well as distant futures.

Now suppose that wheat stocks in May are such that a portion of them will be carried through July, but none to September, will expectations pertinent to the price of the September future deserve to have a bearing on the price of the May future? Logically they should. Stocks of new wheat will be in existence in July which will be carried through September, requiring the price of July wheat to respond fully to expectations pertinent to the price of September; and since the May and July prices are logically connected by stocks to be carried from May through July, expectations that bear on the price of September wheat should bear equally on the price of May wheat.

Extension of this reasoning through whatever number of steps may be required indicates that, in the slightly simplified conditions supposed, expectations which deserve to influence the price of the most distant future quoted should always bear equally on spot prices, unless a period intervenes when stocks from both past and future production are expected to be non-existent.

Stocks of wheat in the United States during over half a century have never fallen much below 60 million bushels except under governmental control in 1917, and during the last quarter-century have not fallen below 80 million bushels. At their lowest level of any crop year, near the first of July, much less than half of the stocks of old wheat may be hard winter, which is usually the class represented directly by the Chicago future, but even stocks of that class have never been negligibly small. Therefore this theory requires that expectations which affect the price of the most distant Chicago wheat future should always be reflected equally in the price of the near future, and that such expectations should have no influence on price differences.

Looking now to the facts, we may hope to determine as a matter of actual observation whether futures prices do behave about as should be expected on the foregoing theory, or more nearly in accord with the belief that price differences between futures commonly reflect expectations regarding future developments.[28] The

[28] In this instance, as usually in the development of scientific concepts, the new theory arose out of observations that were found to conflict with earlier theory, and led in turn to further observations. In summarizing the evidence, it is convenient to state the theory first and follow with pertinent observational data, without discriminating between observations that preceded formulation of the theory and

clearest case for supposing that near futures may respond weakly to expectations which affect the price of a distant future exists when inverse carrying charges are large; the expectations which are most closely measurable and seem capable of having the greatest differential price effects are those pertaining to size of a crop not yet harvested. It seems, therefore, that a critical test may be made by studying the effects of large changes in crop prospects on price relations between the May wheat future at Chicago and the July future. The May is clearly an "old-crop" future while the July is universally regarded in the grain trade as a "new-crop" future; and the July has often sold at large discounts under the May.

In long and critical study of price relations between old- and new-crop wheat futures at Chicago, the only evidence I have found of effects of crop prospects is of effects that lasted for not more than a week or two. Now and then reports of crop damage have seemed to result at first in a slightly greater price rise in the July future than in the May, but the consequent diminution of the inverse carrying charge has usually been followed within a few days by an increase to about what the carrying charge was before the report of crop damage. Unexpectedly favorable crop reports have had similar effects in the opposite direction, which have tended also to be followed quickly by a return toward the previous price relation. The behavior in such instances suggests that reports of crop damage, for example, may have an initial effect which is slightly greater on the new-crop futures than on the May because so many traders believe that such should be the case, but that the result is a maladjustment of price relations which cannot persist. Even such wholly temporary correspondence of price behavior with the theory that new-crop prospects should especially effect the new-crop futures is the exception rather than the rule.[29]

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those that followed. The original observations that affected my own thinking concerned relations between the July and September futures at Chicago, which do not bear so obviously on the theoretical issue as similar observations made later.

[29] Details of the original studies on which this statement is based have not been published. They were made early in the investigation and served to force search for other explanations of inverse carrying charges; the affirmative findings were published in "Price Relations between July and September Wheat Futures at Chicago," *Wheat Studies*, March 1933, IX 187–238, and "Price Relations between May and New-Crop Wheat Futures at Chicago," *Wheat Studies*, February 1934, X, 183–228. The published results include correlation analyses which bear directly but not quite so obviously on the present question. Week-to-week changes in prices and price spreads were found to follow a pattern which is the reverse of that predicted by the theory that inverse carrying charges depend largely on expectations concerning

For the Liverpool wheat market, the evidence is a little different. On the supposition that expectations should affect prices for different forward dates differently, the spread between prices of the December and March futures at Liverpool should depend on the expected size of the Southern Hemisphere exportable surplus, on which Europe used to rely for much of its imported wheat after January or February of each year. Analysis of the data shows that such expectations had no important bearing on the December-March price spread. Yet when *changes* between the earliest and latest pre-harvest estimates of Southern Hemisphere surplus in each crop year are related to concurrent changes in the December-March price spread, a small but statistically significant correlation appears.[30] At Liverpool, unlike Chicago, expectations regarding supplies that would become available between two future months apparently had some influence, small in relation to others, but measurable and not wholly temporary, on the differences between forward prices applying to those two months.

It cannot be said, then, that expectations regarding supplies which will become available later always, in all futures markets, have exactly as much effect on prices of near as of distant futures. But if such expectations tend in some markets to have an influence on inverse carrying charges, the effect is small in relation to other influences. An inverse carrying charge may never be regarded as a specific measure of the price effect of expected future developments.

We turn in the next section to a development of the theory that existence of stocks provides a link between spot prices and near and distant futures even when the temporal price structure is "inverted." It will then be found that some influence of price expectations on carrying charges is not excluded as a possibility under certain circumstances.

The Price of Storage

The origin and prevalence of the term "carrying charge" in trade usage reflects the fact that hedgers commonly regard the designated

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future developments. On that theory, a widening, for example, of an inverse carrying charge should occur typically in connection with a decline in price of the distant future accompanied by little or no decline in the price of the near future. The statistical analyses, however, show that widening of an inverse carrying charge occurs typically in connection with a price advance in the near future, accompanied by a much smaller price advance in the distant future.

[30] Sidney Hoos and Holbrook Working, "Price Relations of Liverpool Wheat Futures," *Wheat Studies*, November 1940, XVII, 114.

price differences as in fact equivalent to a price for "carrying" the commodity, or what may be called for the purpose of economic analysis a *price of storage*. The market is said to show a "full carrying charge" when the price differences approximate the costs of carrying the commodity in public storage at the fixed rates for such storage plus interest and insurance. One meets also the expression "the market shows a carrying charge," as equivalent to a statement that the carrying charge is positive. This usage implies at least a tendency to associate the concept of price of storage more particularly with positive than with inverse carrying charges.

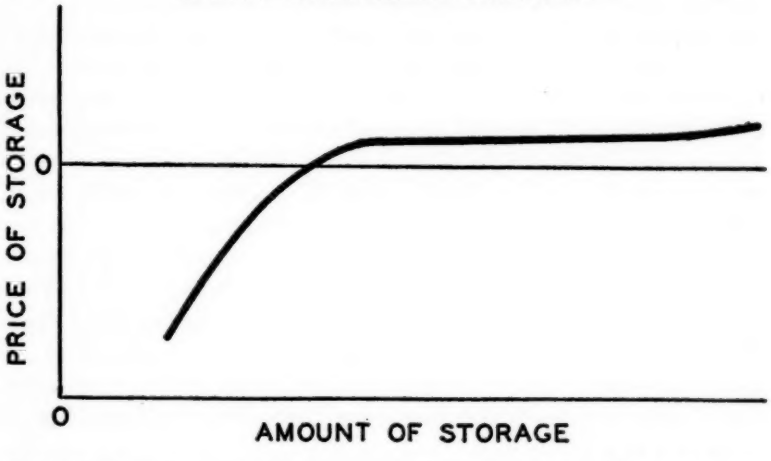
When the carrying charge is positive, as in the example in our opening paragraph, it is clearly a measure or an index of returns for carrying the commodity hedged. Anyone who is in a position to handle the necessary business transactions may buy September wheat, in such a situation, sell December or May, and take delivery on the September contract with assurance of a gross return of eight cents per bushel for carrying the wheat from the time of delivery to the first of December, or of eighteen cents for carrying it to the first of May. For one who already owns hedged wheat on the first of September, the meaning of the price relations may not be quite so precise. If the wheat is of minimum quality for delivery on futures contracts and is eligible for such delivery, the assured returns are the same as when the wheat is acquired by purchase of the September future, unless such wheat is currently selling slightly over the price of the future, as it might well be if the "carrying charges" were much smaller than are here assumed, but could scarcely be under the conditions supposed. If the wheat owned is like most stored wheat at any time, not of minimum deliverable quality, or not in position for delivery, or both, the return actually realized from storage will depend on whether the price obtainable for that wheat next December (or May) stands in the same relation to the December (or May) future as it had to the September future on September 1; the returns for storage will probably approximate the carrying charge reflected in the futures market, but may be greater or less.

If it is advantageous to regard a positive carrying charge as a price for storage, as traders do, there may be similar advantages to gain from extending the concept to include inverse carrying charges. Other theories of inverse carrying charges have proved so inadequate and misleading, as we have seen, that a better theory is much to be desired.

There is nothing obvious in the behavior of market carrying charges to indicate that they take on a different character when they shift from positive to negative or from negative to positive.[31] Market transactions that are directly related to the carrying charge—purchase and storage of the commodity against sales in the futures markets—tend to be on a large scale when the carrying charge is positive and large, and on a smaller scale when the carrying charge is negative and large, but the transition between these extremes is a continuous one; no sharp change in hedging practice occurs when the carrying charge changes sign.

Carrying charges behave like prices of storage as regards their relation to the quantity of stocks held in storage. Graphically represented, the relation should be that of a supply curve, showing small amounts of storage service rendered when the price of storage is low, and increasing amounts as the price of storage advances. The general form of the curves seems to be like that in Chart 2.

CHART 2.—TYPICAL STORAGE SUPPLY CURVE



Statistical analysis, treating carrying charge as a price, has shown such relationships to exist, and to be capable in some instances of fairly precise statistical determination.[32] Correlations between

[31] See, for example, charts of the May–July and July–September inter-option spreads at Chicago, in "Relations between May and New-Crop Futures," *Wheat Studies*, February 1934, X, 220, 222, and "Relations between July and September Futures," *Wheat Studies*, March 1933, IX, 192, 194.

[32] See "Relations between July and September Futures," *Wheat Studies*, March 1933, IX, 206; "Relations between May and New-Crop Futures," February 1934, X, 187, 190, 191; Hoos and Working, "Liverpool Wheat Futures," *Wheat Studies*, November 1940, XVII, 118.

stocks and carrying charge tend to be highest for relationships involving carrying charges that often take on large negative values, like that for wheat between May and July in the Chicago market. Clearly, therefore, the supply-curve relationship between amount of storage and price of storage does not break down when the "price" becomes negative.

The statistical results indicate also that the market carrying charge, viewed as a price of storage, is broadly representative. The correlations with the carrying charge in the Chicago market are higher for statistics of all stocks of wheat in the United States than for statistics covering only stocks likely to be hedged, or covering only stocks likely to be hedged in the Chicago market. Carrying charges recorded in the Liverpool wheat market show similar evidence of representativeness.[33]

The treatment of inverse carrying charges as prices of storage raises some problems of theory. First is a difficulty arising from the logical presumption that no substantial volume of stocks will be carried without assurance or expectation of at least a small return for carrying it. The presumption is not open to question, but it does not necessarily require that the price of storage be positive. For example, people "store" rented works of art in their homes, paying for the privilege. Storage of goods without direct remuneration and without expectation of price appreciation is to be observed in every retail store. A merchant might adopt the practice of buying today only what he could be sure of selling before tomorrow, or before the next delivery day, but if he did so he would be unlikely to remain long in business; he must carry stocks beyond known immediate needs and take his return in general customer satisfaction. Merchants who deal in goods that are subject to whims of fashion, or to sudden obsolescence for other reasons, must lay in stocks and carry them in expectation that some part of the stocks will have to be sold at a heavy loss.

These observations illustrate a fact which Nicholas Kaldor has expressed in general terms by saying that "stocks of all goods possess a yield . . . and this yield which is a compensation to the holder of stocks, must be deducted from carrying costs proper in

[33] Some of the evidence for the Chicago market may be found in *Wheat Studies*, IX, 204–208; for Liverpool, *ibid.*, XVII, 124–126.

In United States markets, differences between the spot price, or the price of a future soon to expire, and prices of distant futures have often been rendered quite unrepresentative by corners and squeezes.

calculating net carrying cost. The latter can, therefore, be negative or positive."[34]

Though stocks, as such, may be productive, with the result that some quantity will be carried even when loss from price depreciation is expected, or, if they are hedged, when an inverse carrying charge makes a loss virtually certain, it has not been considered obvious that the marginal yield of stocks can be sufficient to offset a large inverse carrying charge. Kaldor, thinking of producers' stocks, ascribed the yield to "convenience" and held that it is largely lost if the stocks are sold forward—for example, hedged;[35] and Gerda Blau has argued that "the 'convenience yield' of standard commodities dealt with in Future Exchanges is very small."[36] For the wheat market of the United States these doubts may best be answered by the fact that the largest inverse carrying charges between the May and July futures at Chicago—the largest in terms of monthly rates that occur there—have never prevented the carrying of substantial aggregate quantities of wheat hedged in the Chicago market.[37] The reasons, which have never been carefully explored, doubtless vary with the circumstances and type of business of the individual or firm that carried the stocks. For present purposes it is sufficient to note the fact.

Distinction is sometimes drawn between "surplus stocks" which a merchant or manufacturer will not carry without assurance or expectation of a special return, and "necessary working stocks" which will be carried for other reasons. The concept of working stocks as fixed in amount (necessary) may be warranted for many purposes but is inadmissible in serious consideration of the economics of stockcarrying. The aggregate of "working stocks" of a commodity in a market area may vary through a considerable range. Its upper limit may be defined as the level at which an increase in stocks will produce no increment of "yield," in Kaldor's phrase. Additional stocks, which will be carried only in response to

[34] "Speculation and Economic Stability," *Review of Economic Studies*, 1939–40, VII, 3.

[35] *Op. cit.*, p. 6, and "Symposium on the Theory of the Forward Market," *ibid.*, p. 199 n.

[36] "Some Aspects of the Theory of Futures Trading," *Review of Economic Studies*, 1944–45, XII, 4.

[37] For example, in spite of the extraordinarily large inverse carrying charges that prevailed in the spring of 1947 (see Table 1), the Commodity Exchange Authority found that reporting hedgers on May 31, 1947, were "short" 6,599,000 bushels in Chicago futures. On June 14 the reported short hedging commitments were 9,439,000 bushels (preliminary figures kindly supplied by letter).

assurance or expectation of a special return at least equal to "carrying costs proper," may be defined as surplus stocks. For wheat stocks in the United States as of June 30, marginal "yield" seems to disappear and additional stocks to be regarded as surplus when the total is somewhere between 150 and 200 million bushels.[38] The transition point is then depressed to about its minimum because producers, merchants and processors are all anticipating large additions to their stocks very shortly.[39] Minimum working stocks, though difficult to define in principle, seem fairly closely determinable for practical purposes at about 80 million bushels as of June 30; reduction below that level, under present conditions, seems to be very difficult.

Having found that the apparent logical obstacles to treating inverse carrying charges as prices of storage disappear on analysis, let us examine somewhat further the practical merits of the concept.

The carrying charge is one of three variables related by the equation

$$P_1 + P_s - P_2 = 0, \tag{1}$$

where P_1 = a spot or forward price,
P_2 = a forward price for a date later than that to which P_1 applies, and
P_s = carrying charge (price of storage).

Equation (1) gives no information by itself regarding the economic influences which determine any one of the variables included, but it affords a basis for explaining any one of them in terms of known explanations of the other two. When so used, it may well be rewritten by transposition in the appropriate one of the following three forms:

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[38] The transition point is not precisely determinate and doubtless varies considerably from year to year.

[39] During autumn and early winter the upper limit of aggregate "working stocks" of wheat for the United States may continuously exceed 500 million bushels. This estimate includes "working stocks" of wheat growers. The producer of a seasonal crop provides storage, among other reasons, to avoid the excessive cost of marketing very rapidly immediately after harvest. The quantity which he is willing to carry at a given time without expectation of price appreciation is at its maximum just after the harvest, when it may approximate his total crop, and tends to decline progressively thereafter. The volume of wheat stocks which a typical merchant regards as just short of surplus for him likewise varies greatly through the crop year, with its maximum probably at about the time of maximum rate of marketing by producers.

$$P_1 = P_2 - P_s \tag{1a}$$

$$P_2 = P_1 + P_s \tag{1b}$$

$$P_s = P_2 - P_1. \tag{1c}$$

Treatment of the carrying charge as a price of storage involves providing a direct explanation of P_s instead of relying on explanation in terms of differences between the explanation of P_1 and that of P_2. Direct explanation is useful for two reasons: (a) it is simpler and more reliable than indirect explanation on the basis of differences between the explanations of P_1 and P_2; and (b) it opens the possibility of explaining either P_1 or P_2 in terms of an explanation of the other and of P_s. These advantages prove substantial in practice. They arise partly because the important influences affecting P_s are usually fewer than those affecting P_1 and different from those affecting P_2; and partly because P_1 and P_2 always have important determining influences in common, with the result that indirect appraisal of the effect of those influences on P_s requires quantitatively precise knowledge of their effects on both P_1 and P_2. I may illustrate with a few examples.

Consider first the effect of reports of damage to the American winter-wheat crop on the difference between prices of May and July wheat at Chicago at a time when the price of the July future is some ten percent below the price of the May. The indirect approach has led uniformly, so far as I know, to the opinion that in those circumstances the reports of crop damage should affect the price of July wheat considerably more than the price of May wheat, and therefore should reduce the price difference between them. This is a conclusion, however, that is contrary to the facts, as we have noted in the previous section. If one takes the direct approach permitted by treating the difference as itself a price of storage, it becomes apparent that no substantial effect is to be expected; the crop damage has no influence on the volume of stocks to be carried from May to July, and it is unlikely to have much influence on the "price" at which holders are willing to carry given stocks.[40]

Consider, second, the effect of reports of damage to the Southern Hemisphere wheat crop on the difference between the prices of

[40] Some effect is conceivable, principally because the crop damage may affect the distribution of stocks, either directly or through the attendant price change, but no such effects on carrying charges in the United States have been shown to occur.

the December and the March futures at Liverpool, when the price of the March future was considerably below the December. The indirect approach has tended toward conclusions which were quite erroneous, at least as regards the magnitude of the effect on the price difference. The direct approach leads to the conclusion that the effect might differ according to circumstances. Study of the behavior of the "price of storage" at Liverpool when international trade in wheat was relatively free indicates that the December–March carrying charge there was causally related to expected total stocks of imported wheat in Europe in December.[41] The level of these stocks could be appreciably affected by Southern Hemisphere crop damage. One possible chain of effects was that news of the crop damage might produce such a strong price advance in Northern Hemisphere exporting countries that European importers would allow their stocks to run down, hoping to buy more cheaply later, and that the reduction of stocks would be accompanied by increase in the inverse carrying charge (elevation of the December future relative to the March). What more often happened was that Southern Hemisphere crop damage was viewed rather more seriously by European importers than by most traders in exporting countries of the Northern Hemisphere; importers tended to avoid letting stocks run so low in December as they would have otherwise, and the inverse carrying charge tended to narrow slightly (the December future declined relative to the March).

Now consider an influence of another sort: the rather prevalent belief in the winter of 1946–47 that a business recession was in prospect. This was regarded by many as sufficient to explain the large inverse carrying charges which prevailed in many futures markets at that time. Any of several lines of reasoning could be followed to reach that conclusion: it might be thought that the futures markets, being open to short selling as cash markets are not, tended especially to be depressed by selling on the part of those who anticipated business recession; or it might be argued that prices of deferred futures were depressed because the expectation of business recession implied expectation of price decline and that it is the business of futures markets to reflect expectations of price change; or again, it might be reasoned that the futures prices were depressed

[41] Hoos and Working, "Price Relations of Liverpool Wheat Futures," *Wheat Studies*, November 1940, XVII, 114–125.

relative to spot prices because the people who trade only in futures markets more generally expected a business recession than did those who trade only in cash markets.

A direct approach to explanation of inverse carrying charges in 1946–47, treating them as prices of storage, could lead to conclusions somewhat similar to those from the indirect approach. Though expectation of business recession could scarcely affect the price of storage through producing a significant change in the amount of wheat, for example, that would be held in storage from December to May or from May to July, it might have an influence on the distribution of stocks. If wheat growers tended to ignore or to disagree with the prevalent opinion in commercial circles, they might consider the current market price to be unduly depressed, and be led, therefore, to hold wheat back on the farms. Because the market price of storage, though related to total stocks and not merely to hedged stocks or to stocks in commercial channels, may be especially affected by the level of commerical stocks, strong holding by producers may have some tendency toward development of inverse carrying charges. But the direct approach, permitting this line of explanation, permits also a check on the hypothesis, which in this case compels its rejection. Informed observers were nearly unanimous in the opinion that wheat growers in the winter of 1946–47 were not showing any notable tendency to hold back their wheat. Commercial stocks of wheat outside of producing areas were indeed relatively low, but they were so principally because of the strenuous efforts that were being made to expand exports, and partly because of shortage of freight cars, which retarded movement to primary markets. The direct approach thus leads to the conclusion that, in the case of wheat at least, the large inverse carrying charges during the winter and spring of 1946–47 are to be attributed mainly to relative shortage of supplies, aggravated by transportation difficulties.[42]

Direct explanation of inverse carrying charges yields a gain in the form of better understanding of cash and futures prices that may be as important as the gain in understanding of carrying charges themselves. Because the carrying charge, whether positive or negative, is determined by influences that are largely or wholly

[42] Year-end stocks were drawn down to the remarkably low level of 83 million bushels.

independent of those affecting the price of a distant future, the equation

$$P_1 = P_2 - P_s \tag{1a}$$

has special economic significance. Usually the "nearer" price, P_1, may be explained best in terms of the set of influences that affect the more distant price and the almost wholly separate and additional set of influences that affect the price of storage, P_s. Because P_2 and P_s are substantially independent, influences affecting the price of a distant future, P_2, may be regarded as having an approximately equal effect on any nearer price. Similarly, any influence affecting the carrying charge, P_s, must tend to have an equal and opposite effect on the near price. The latter fact deserves notice especially in studies of particular price situations, because it permits significant information, which can often be obtained regarding reasons for a given carrying charge, to be applied in the explanation of price.

Conclusions

The thread of argument in the foregoing pages has proceeded from a consideration of several attempted explanations of inverse carrying charges, which are found defective, to an explanation which views inverse carrying charges, like positive carrying charges, as market-determined prices of storage. Since the explanations rejected were not figures of straw set up as a mere device of exposition, it should be surprising if they do not carry some elements of truth. I should like in concluding to bring into relation the final explanation and what seem to me the the true and useful features of the unsatisfactory attempts.

For some purposes it is necessary to treat cash markets as distinct from futures markets. They are distinguishable in much the same sense that a country market may be distinguished from the terminal market which it supplies, or the Kansas City wheat market from that at Chicago. Error arises only if the strength of the influences which connect their prices is underestimated. The foregoing demonstration that inverse carrying charges may be treated as prices of storage is independent evidence that "arbitrage" between cash and futures markets remains effective even when the futures price falls much below the spot price. Though the direct proof has been given here only for the Chicago wheat market, the

conclusion may be applicable to all important futures markets since it requires only that hedging continue in spite of inverse carrying charges, and I think it likely that no futures market can persist without the continuous presence of a substantial amount of hedging.

The idea that futures prices tend to have a downward bias probably has some validity, but it is not a useful starting point for a theory of carrying charges. The view which Keynes combined with it, that hedgers may accept a sacrifice to avoid risk, can be useful, however, in another context; it seems pertinent as partial explanation of the "supply curve for storage." The belief that expectations concerning future events tend to be discounted is unquestionably sound, but it must be applied with recognition that the possible future events include those which would be price-depressing as well as those which would be price-elevating. Discounting expectations of a price-depressing event must tend toward a present price higher than would prevail without discounting. With that amendment, the theory of discounting has useful applications in interpretation of carrying charges.[43]

Prevalence of the idea that expectations of price change should be reflected in differences between spot and futures prices is significant principally as evidence of the extent to which the actual economic functions of futures markets are misunderstood, even by some people who have much practical knowledge of the markets. There is a good deal of excuse for such misunderstanding because the facts are difficult to express without ambiguity, and can be understood only if clear distinction is drawn between expectations arising from an existing supply situation and expectations regarding future supply or demand developments. There is, moreover, a grain of truth in the idea that expectations regarding future supply and demand may affect spot-future price spreads; but any supposed effect that cannot be explained in terms of the concept of price of storage deserves to be met with suspicion.

Finally, the main positive conclusions that we have reached may

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[43] For example, inter-option price spreads for wheat at both Chicago and Liverpool have been found to show no important general tendency for the distant future to rise or to decline during the "life" of the spreads; but if the years be classified on a rational basis, some conspicuous tendencies may be found which invite explanation on the ground that advance evidence of extreme conditions in *either* direction from the average tend to be discounted toward the average. See charts in *Wheat Studies*, February 1934, IX, 210, and November 1940, XVII, 128.

be summarized and perhaps illuminated a little by expressing them as answers to three questions propounded in an introductory paragraph above. Taking the questions in reverse order, answers may now be given as follows:

(1) Spot and futures prices for a commodity are intimately connected at all times. Even when the spot price is far above the price of a deferred future, it tends to respond fully to influences that affect the price of the future.

(2) Inverse carrying charges are reliable indications of current shortage; the forecast of price decline which they imply is no more reliable than a forecast which might be made from sufficient knowledge of the current supply situation itself. Inverse carrying charges do not, in general, measure expected consequences of future developments.

(3) An inverse carrying charge between December and May wheat futures in the United States must be explained in somewhat different terms in August, say, than in December; in August it rests on expectations regarding conditions that will exist in December. As of December, it means that supplies of wheat in commercial channels are so small that holders of hedged stocks expect to dispose of most of their stocks before the spot price declines appreciably (relative to the May future), and that they are willing to risk loss on a fraction of the stocks for the sake of assurance against having their merchandising or manufacturing activities handicapped by shortage of supplies.

SOME ECONOMIC ASPECTS OF AGRICULTURAL CONTROL

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WITHIN very broad limits, Americans are free to bid for goods and services and to allocate their capital as they please. The relative investment of capital in various lines is roughly determined by consumer preferences. Imputed returns are largely available for private disposition by the owners of resources. As an integral part of private capitalism, a social system which is still basically individualistic has arisen. Despite increasing intervention by government as buyer, seller, producer or financier, the American economy is still guided in the main by the separate efforts of consumers to maximize returns from their incomes and of producers to maximize returns from the use of their resources.

At least two undesirable aspects of the farm income pattern appear to be closely related to this private capitalistic structure of the economy. At any rate, their solution has often been sought through attempts to restrict the expression of individual economic competition.

Long-run Inequality. First, the farm sector of the economy has long been disadvantaged in money income. This disparity is attributable to inequalities in human productivity which arise out of inequalities in training and in employment opportunities and out of a variety of pressures which limit the mobility or impede the revaluation of capital. The productivity of capital equipment and land varies among racial, occupational, and geographic groups. The ratio of manpower to productive resources also varies. Any permanent lessening of occupational inequality of long-run income must increase the relative productivity of labor or the ratio of resources to people in the depressed sectors.

However, efforts have long been made to enhance farm income by subsidies or supports and through production or marketing controls. Such devices can conceivably increase the relative share of the national dividend accruing to farmers. They do not, however, necessarily lead to an increased total dividend nor are they self liquidating nor even permanently operational. Non-commerical farmers are most seriously disadvantaged relative to other occupa-

tional groups. Such non-commercial farmers are not directly or greatly benefited by most control programs.

Short-run Inequality. Second, farm incomes are subject to more violent fluctuations than are incomes in most other parts of the economy. The violence of these fluctuations is attributable to the low price-elasticity of farm output which in conjunction with low price-elasticity of demand more than counters the effects of low income-elasticity of demand for farm products. In other sectors of the economy, price is held fairly stable by adjustment of output to changes in the level of demand.

Interventionist Solutions to the Problems. Neither long-run inequalities nor short-run instability of incomes need occur in authoritarian or other non-capitalistic economies where government promulgates consumption decisions and directs the allocation of productive resources. Through forced mobility, forced revaluation or forced liquidation of capital assets, the government may, if it wishes, eliminate long-run inequalities—or create new ones. Similarly there is no true cycle in employment or money incomes in the non-capitalist economy, although there are probably other types of cyclical fluctuations. Thus, one apparent method by which these apparent ills of the capitalist economy may be bettered is to circumscribe the power of individuals to determine the disposition of their funds or the allocation of their resources. It is probable that central determination of economic decisions can in fact stabilize or equalize incomes but economic freedom will be lessened and ultimately political freedom may be impaired.

The case for governmental controls is based upon the implicit assumptions that long-run inequality and short-run instability are undesirable and that both can be mitigated through transfer of economic decision-making from individuals to agencies of government. This transfer of the governing economic decisions changes both the role of government and the structure of the economy. The status of agriculture in the total economy is altered and the managerial independence of farm entrepreneurs is impaired. Expression both of consumer and investor preference is restricted.

Objectives of Control. The immediate objective of production, marketing, price or credit controls by government in the farm economy is to increase returns to farm entrepreneurs and to resources owned by them. The price or returns to such factors can be increased either by increasing their marginal physical produc-

tivity—provided no counter-change in price of the end, good occurs thereby—or by manipulating the price of the end-good or both.[1] In general, there are two broad methods by which these ends are sought. Market control is the manipulation of one or more of the factors affecting price of the end good. Production control is manipulation of one or more of the factors affecting volume of output. Both are intended to raise the price of the end good. The latter is intended to increase the marginal physical productivity of farm resources.[2] Both are intended to increase the marginal revenue product of the farm resource.

Market controls are designed to manipulate either the level of demand or the quantity sold on given demands.

Production controls generally are designed merely to curtail volume of output as a means of manipulating the volume sold and thus enhancing price. Ordinarily, no effort is made precisely to specify either all the factors which shall be used for the combinations in which given factors shall be used. Thus production control raises the realized marginal physical product only by decreasing the amount of the factor which is used and simultaneously decreasing the total output.[3] No effort is made to lift the level of the entire marginal product function. Neither price nor production is uniquely dependent upon any single variable. If land is limited, but no restraint is placed over changing the factors combined with the permitted volume of land, production may not be decreased. Control over any single factor may not in fact lead to control over price or output.

Effects of Controls. Controls of any nature alter the competitive structure of the economy. The level of competition, at least with respect to the variables under control, is lifted from individuals to groups. Group profit is jointly maximized. The control

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[1] In a monopoloid situation, increase in price-elasticity of demand for the end good with no change in marginal physical product or price can raise returns to productive factors. The marginal physical productivity of farm assets may be raised by changes in techniques of production. This method involves production of a larger amount of the end good and a fall in price which may be more than counter the increased productivity. The marginal physical product may also be raised by decreasing the amount of the factor used without changing the volume of other factors. In this case, both the marginal increment to total product and its value in money will rise, although total physical output will fall.

[2] The level of this function is not raised, but since it slopes negatively, withdrawal of capital will raise the productivity of remaining units.

[3] It will be demonstrated later that it is usually impossible to control production merely by controlling a single factor.

agency must regard the effects of its own actions upon price and net returns. By yielding up some part of their independence, the firms affiliated with a control program may thereby do two things they would not be able to do if they functioned as competitive units.

First, it is possible to lower the money price of factors or services which farmers buy. Market controls which govern trade practices and charges are one means of reaching this end. These cost savings, however, never have been a major goal of control schemes.

Most market and production control schemes have sought to raise the price of the end good. Two techniques—both requiring monopoloid organization—have been used. First, by regulating some factor associated with variations in price, the level of demand is manipulated.[4] Second, either by sales or production control, the quantity sold on some specified demand function or functions is manipulated. Market controls are designed for both goals. Production controls are almost invariably intended to manipulate amounts available for sale on a given demand rather than to affect the demand itself.

No single enterprise operating under atomistic competition can use these techniques. The power to control production or sales or to manipulate levels of demand increases as industry organization approaches conceptual monopoly. To establish a control mechanism, the factors affecting price or output must be identified and their interrelationships must be measured. Then one or more of these variables must be selected and an administrative agency to manipulate their magnitude and to allocate sales or production quotas must be established. Finally, means to require individual producers or shippers to abide by the decisions of the control agency must be perfected.

When this is done, the right to make some or all of the decisions which affect the profitability of his enterprise is removed from the discretion of the individual manager. Decisions once made by him for his own benefit and with little regard to their impact on market prices are after the initiation of the control program made by representatives of the group for group benefit and with explicit regard to their probable effects upon prices. In general, only a few

[4] Almost invariably grade, size or quantity controls are intended to control only intra-seasonal levels of demands. While seasonal demands may be serially related, few control agencies have been disposed to recognize the possible effects of limitation upon subsequent demands.

of the major production or marketing decisions are transferred from the authority of the individual manager. A broad range of other decisions—particularly those relevant to combination of resources and scale of plant—remain within his discretion. Thus, despite controls or supports, the individual firm regards itself as a separate profit-maximizing entity. From this view stems the almost universal instability of controls. The firms are constrained from shipping or producing the quantities which, given their plant, would be most desirable under competitive conditions at the price level obtained through control. Individual firms consider that overshipments or over-production will be profitable. Their expectations will be fulfilled provided few other enterprises violate allotments. Thus control programs which are essentially monopoloid do not entirely destroy the individuality of affiliated firms. Such firms are thereby induced to violate their commitments.

The Place for Market Controls. Production and market controls are part of a broad program by which purchasing power earned by non-farm groups is transferred to farmers. Such income-transfers may be in the public interest, at least as defined by the Congress. However, the Congress has at least nominally committed itself to the eradication of monopoly in other sectors of the economy. In actively promoting these monopoloid techniques which are felonious if used by other groups, the Congress should be certain that the ends sought will in fact be achieved without excessive damage to the long-run interests either of farmers or other groups.

In an economy like this one, it is unwise to reject a program merely because it is monopolistic or because compulsory participation is required by the fundamental divergence of firm and group interest. Appraisal requires criteria. Several are suggested: the effects of the program upon short-run returns to producers; its effects upon level of demand and volume of output in subsequent periods; its effects upon income to handlers and processors; its effects upon real income to consumers. Judged by these standards, controls are neither good nor bad. On balance, some are desirable and others are not. All of them can be used badly. The interests of these groups are diverse. The policy-making agency must strike the balance and make the choice with respect to the nature and degree of control over production and marketing.

There are four major problems in which the use of market controls has conformed with these standards.

The Short-Run or Seasonal Surplus. The short-run or seasonal surplus is the difference between the produced industry output and the volume of sales which would lead to some desired level of on-farm returns. There may be a seasonal surplus at the producer level and no surplus at any other level of marketing. Without monopoloid controls, the total industry output would be shipped provided that anticipated on-farm price equalled or exceeded the average costs of picking, packing, shipping and selling. Thus in years of depressed demands or large yields or both, atomistic shipping patterns may bring losses while controlled shipping may protect producers against the impact of these unpredictable changes in demand.

Returns from agricultural plant well adjusted to long-run demands may be threatened by short-run variations in yields or in demand or both. In industrial sectors, variable factors are turned loose and fixed plant can lie idle without serious deterioration. Ordinarily, a decrease in short-run farm output involves serious damage to fixed plant, and quite often variable costs cannot be saved. The single feasible solution is control over shipments, which in this case is no more and probably less reprehensible economically and morally than the adjustment made in other industries without sanction of monopoly under law. Market control is feasible only with legal compulsion requiring all firms to participate and restraining the inevitable inducement to violate allotments. Limitation of shipments can be integrated with other programs under state and federal laws. Provision is made for grade and size limitations, for diversion programs and for reserve pools. Central control over the disposition of such seasonal surpluses is entirely feasible from the administrative viewpoint. Allotment of shipping rights has been the source of greatest difficulty.

Short-run income to producers can be raised by market control. Unless price is raised well above the level which would have prevailed in the absence of demand-depression or yield-increase, no subsequent fall in demand or increase in output should be engendered. Handlers and processors will usually be disadvantaged in the short-run by such limitation of shipments. There appear to be no tenable reasons that part of the burden of short-run fluctuations should not be passed on to these groups. Consumers will be damaged only insofar as they would have capitalized in the short-

run on the fall of price below the competitive level. Thus, the restrained use of market control as a solution to the short-run surplus meets the criteria set out; short-run income to producers can be raised without prejudice to long-run income; neither consumers nor handlers should be excessively penalized; no uneconomical diversion of resources need follow.

Controlled Distribution among Alternative Outlets. Where demands in alternative outlets are unrelated, controlled distribution will lead to enhanced industry returns whenever demands are significantly different in the various outlets and interpenetration of markets can be prevented.[5] Atomistic shipment patterns would lead to equalization of f.o.b. shipping point prices in all outlets. With central control, f.o.b. shipping point marginal revenues could be equalized and industry returns could be increased. This is a frankly monopolistic technique. Its use need not, however, necessarily involve limitation of total shipments. Such limitation may occur and in any event, if income-benefits are to be obtained, distribution of sales will differ from the competitive pattern.

Short-run returns to producers can be raised only where all shippers participate and are restrained from violation. No generalization can be adduced with respect to long-run effects on producer-returns. Enhanced receipts will ordinarily lead to increased production. But discriminatory pricing may also lead to increased consumption over the long-run. Handlers or processors need not be penalized except where diversion to other uses or dumping results. No general statements with respect to consumers may be made. Some will benefit from lowered prices and others will suffer from increased prices. The net effect cannot be aggregated. In short, discriminatory marketing may meet the criteria set out. Whether it does so is a matter of fact to be determined in each application.

Where demands in alternative outlets are interdependent, market control agencies can prevent shipments in one outlet which will adversely affect levels of demand in other outlets.[6] With competitive organization of industry, if there is uncertainty with respect to

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[5] Demands are unrelated when realized or anticipated sales in one outlet have no effect upon shape or level of demand in other outlets.

[6] Markets are interdependent when realized or anticipated sales in one outlet affect level of demand in other outlets.

demand, shippers ordinarily ship to the largest market which may not in fact be the most elastic. From this, the phenomenon of gluts and famines arises.

It is widely believed that sale of large quantities of small sizes and low grades results in depression of demand for large sizes and high grades over several subsequent shipping periods. This sequence probably does not always occur. Diversion of low grades or small sizes from primary channels may penalize low-income consumers and may not in fact enhance income to producers. But where demands are so interrelated and where atomistic shipment patterns prevail, control of grades and sizes may prevent drastic deflation of demands in related outlets.

It is also widely held that within any single outlet the quantity sold and the prices realized in the past or expected in the future effectively determine the level and shape of demand in the current period. Shipment of quantities large enough drastically to depress current price will often depress the entire level of demand in several subsequent periods. Once prices break, even extremely sharp curtailment of shipments may not suffice to restore them.

Demand for other grades may fall as consumers shift patronage to the grades and sizes in which heavy shipments lead to price breaks. Temporal gluts persist primarily because of lagged price adjustments at the retail level. Control boards may therefore enhance industry returns by determination of grade-size distribution and by regulation of rate-of-flow of perishable commodities. This latter control technique usually involves no direct regulation of total seasonal shipments nor of distribution among various outlets.

It is also believed that prices prevailing in certain geographic markets, at certain exchanges and at certain auctions exert a causal influence upon demand in other outlets. Therefore, it follows that control of shipments to these strategic markets will favorably affect the level of demand at other markets. These views, which are not yet empirically assessed, are attributable to the large volume in such markets, patronage by hinterland buyers and their function as bases for price quotations in other markets.

There are other factors which are related to the shape and level of the demand function in any specified outlet. Many of these—such as prices of related goods, magnitude of purchasing power indexes, changes subsumed under trend factors—cannot be directly controlled. Product variation may result in increased demands as

elasticities of substitution are diminished. Advertising expenditure may effectively change the slope or level of demand, although probably too slowly to be useful as a control device in emergency situations.

Where markets are interdependent, controlled distribution should result in increased returns to producers provided that the pattern of relationship is reasonably well known. There is no necessity for decreased returns to handlers nor is there any necessary adverse effect upon consumers. There is no necessity for limitation of total shipments over all outlets. There are no *a priori* bases for determining the effects of such regulation upon supply over the long run. It is doubtful that any seriously adverse effect upon long-run interests of consumers should be expected.

Market Communications. Factors affecting daily or weekly prices are numerous and their interrelationships are complex and unstable. Control agencies can contribute in two additional ways to the stabilization of short-run prices. As clearing houses for market news, control agencies tend to perfect the nature of competition. Second, they are able to provide schedules of shipping intentions. Insofar as control agencies can persuade receivers that probable unloads will conform to published schedules, another one of the price-affecting variables is thus subject to central manipulation.

The clearing-house function need have no effects which would not occur under atomistic competition with full market news. While promulgation of a shipment schedule should heighten control over short-run price, there is no necessity that prices be raised higher than those which would be obtained were knowledge of future shipments generally available.

Trade Practices. Frequently, small agricultural enterprises sell their products to buyers who command a large volume. There are obvious disparities in bargaining power and clearly divergent interests between buyers and producers. Producers have been gravely disadvantaged by this monopsonistic pressure on prices. The problem originates in the fact that large-scale enterprise is approprate to handling and processing but not to production.

Market control techniques make it possible for producers to counter these monopsonoid conglomerates of capital with monopoloid combinations of sellers. Further, without such combination, regulation of charges and practices, open-price filing and provisions

for price adjustments are authorized by present control statutes. Disparities in bargaining power may be lessened by these means.

Producers obviously benefit by curtailment of monopsonistic practices. Processors or handlers obviously suffer to the extent that they are deprived of short-run monopsony returns. The effects upon consumers or upon long-run supply response cannot be determined except by examination of the facts in each case.

The Place for Production Controls. Federal production-control laws are applicable only to basic commodities and are therefore of relatively little importance in the California farm economy. The voluntary sections of the production control statutes provide for acreage allotments supplemented with compliance payments or non-recourse loans. By this means, the control agency manipulates the volume of a strategic factor of production closely related to volume of output and the imputed income of which largely accrues to owners. If the volume of associated factors of production is not changed, returns to the controlled factor would be increased in two ways. The realized marginal productivity would be increased, with no change in the productivity schedule itself. The price of the end-good would be increased as a result of the decrease in output.[7] The rise in marginal productivity and price will presumably more than counter-balance the decrease in the number of units of the factor which are used in production. Thus total money income to the owners of the controlled resource will rise. The problem attacked by this technique is excess capital. This means that less than full use of productive capacity over the long run would increase the total returns to entrepreneurship.

In conditions of seasonal surplus as defined above, withdrawal of a part of fixed and variable capital both would be desirable if the short-run change in yield or demand could be foreseen. This is merely to say that if the difference between total output and the desired output were to be dumped, nothing would be gained by producing this difference. Where the surplus is perennial, there has either been error in judgment or differences between actual conditions and those which had been expected when investment was made. Permanent solution requires either the diversion of productive resources to other uses or their revaluation. This is essentially the process of liquidation through bankruptcy. Market con-

[7] Demand elasticity will also ordinarily rise as produced output decreases.

trol is clearly inappropriate as a solution since no inducement for diversion of capital is created. However, if for better or worse the market is to be limited over a long period, some means of production control appears to be necessary. Otherwise, increased output ultimately breaks down the control mechanism.

The voluntary provisions for production control under federal law are ineffective for prolonged operation. It is usually impossible effectively to limit output through control over any single factor—land for instance. It is almost always possible to increase per unit output from the allotted acreage by increasing the inputs of other factors. Cost of the idle units of the limited resource is zero and inducement for violation of the production control is thereby created. Moreover, part of the factors associated with variation in output from a fixed plant—climatic factors for example—are not susceptible of control even by the control agency itself.

In consequence of the basic weaknesses of voluntary control provisions, the federal statutes contain other provisions which are used either alone or in conjunction with the voluntary programs. Here acreage allotments are made. The allotment multiplied by the normal or average yield is the marketing quota. Unless a quota is issued, the farmer can receive no commodity loans. If acreage exceeds the allotment, penalites are collected.

Here two major variables are manipulated by the control agency—the volume of output and the amount of land. It is assumed that since total volume of production is specified, no effort will be made to increase inputs of other factors as the permitted amount of land is decreased. This expectation, on the whole, has been fulfilled. Deviation from allotted volume of production is mainly attributable to variations in uncontrollable factors affecting output.

This kind of control is a combination of market and production control. Insofar as it is used in the solution of the short-run surplus to prevent excessively large output from capital plant which over the life of major factors of production is reasonably well-adjusted to expected demand and alternative opportunities, such use should conform to the criteria set out above. Short-run income should be raised if demand is inelastic for potential output at the farm level. No serious damage to the economic welfare of handlers or processors need occur. Consumers would be injured only to the extent that they benefit in the short run from the inability of farm enter-

prises to adjust volume of output to sudden changes in the economic context. They might also be damaged if production control were used instead of discriminatory marketing techniques without supply limitations.

However, if these criteria are to be met, the production control provisions may be used only as short-run adjustments to random deviations in demand or yields. They may also be used as short-run adjustments during the transfer of resources or their revaluation. The long-run adjustment of a perennial surplus can be accomplished only by diverting capital or decreasing fixed payments. Production control, particularly if associated with some parity-price norm, will ordinarily impede the diversion of capital. Producers would be gravely damaged in the long run. If excess capital represents a shift in demand, production control frustrates the expression of this shift. If the excess capital is due to increased efficiency in production, production control or supply limitation will preclude passing on these cost savings to consumers.

Structurally, production control is not different from market controls which govern seasonal supply. All the observations relevant to the use of market controls in the short-run surplus problem are relevant here. These techniques may be used for short-run, non-recurring situations to the benefit of producers, without undue damage to other interests, and if not abused they should not unfavorably react upon producers over the long run. Neither production nor market control can be regarded as a solution to the problem of excess capital.

The Place for Price Control. Price support or control is not essentially different from market control. Some government agency stands ready by loans or purchases to buy up the difference between produced supply and the amount which will be taken at some specified price level by private buyers. This program of price support may be applicable either to the season as a whole or to any parts of the season. Thus price control may raise intraseasonal levels of demand by assuring a stable course of prices through the marketing period. Just as in market control, where quantity of sales rather than price is manipulated, a multi-outlet system of marketing is implicit.

The same general observations applicable to market control are appropriate here. If a control agency sets a price, some roughly predictable amount must be purchased by other than private

buyers. If a control agency sets some permitted volume of sales (and this is what production control techniques are basically intended to do) some disposition must be made of the quantity held off the market. Price control, unlike production control, can be integrally related to intraseasonal programs.

Conclusions. There are three major techniques available to producers of California crops for control or support of farm prices and incomes. Federal law makes all methods of market control with the exception of advertising and direct price fixing (except for milk) available for use by shippers of most unprocessed fruits and vegetables. These programs can be integrated with diversion plans under Section 32 and with tariff plans under Section 22. Relief purchases and credit programs may be used as further support of such programs. Production controls are available for use by producers of basic crops. State laws are even more comprehensive than the federal statutes. A wider range of control and promotional powers are permitted. Applicability is not limited to unprocessed products. State laws are free of the parity-price governor which renders use of the federal market control law cumbersome in the short run and dangerous in the long run.

Between these two sets of laws there is ample legal sanction for any reasonable kind of program. There are uses for these schemes which will meet criteria which should be enunciated specifically in federal laws as they are in some of the state laws. In the short-run surplus, incomes can be raised without long-run damage through depression of demand or increase in output. Intraseasonal demand and price levels can be manipulated again without adverse effects. Trade practices can be controlled to improve the bargaining position of small sellers. Market news may be improved. None of these devices is more than a short-run palliative where long-run excess capital exists.

These programs can be used without long-run damage. It does not follow that they will be so used. Producers can gain from reasonable use of these monopoloid techniques. They can be gravely damaged by their abuse to exact high short-run prices or profits. Processors and handlers can frequently shift to other lines if production or sales are limited for more than a few production periods. Consumers are by no means so helpless as they might superficially appear. They are not constrained to buy any product indefinitely at prices they consider to be excessively high. The defense by con-

sumers against these techniques is the greatest long-run threat of monopoly to the welfare of producers. All goods have substitutes so long as consumer income is limited. Foods have close substitutes. Only if all products in some broad commodity group are controlled will the consumer be permanently helpless before production or market controls which are abused. And here it is probable that exaction of the maximization price will induce sufficient new production ultimately to break down the program and leave the producers in a worse position than before its initiation.

The producer group which abuses the privileges of monopoly organization is most vulnerable to damage from economic controls. If the use of these programs is restricted to the problems set out above, neither shift of demand to other products nor increased output of the controlled product should occur. Where these monopoly powers are used only to solve the marketing problems peculiar to the structure of agricultural production, there is little danger of adverse repercussion upon any group. If they are used to exact monopoly powers, two inevitable sequences assure their breakdown. Demand will fall as consumers shift their patronage. The fundamental divergence of firm and group interest in volume of production or sale will lead to breakdown of the control group. It is not society which should be protected from the use of monopoly in agriculture. It is agriculture which should be protected against its abuse.

REORIENTATION OF AGRICULTURAL MARKETING AND PRICE RESEARCH

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I. *The Need for Reorientation*

DURING the last two decades, agricultural marketing and agricultural prices have gradually emerged as separate specialized fields of economic research. Marketing specialists have, in general, centered their attention on descriptive studies of the institutions and technology of the marketing system and the physical handling of farm products from producer to consumer. In many instances, prices and price-making have received hardly more than incidental consideration. Price specialists—although frequently better trained in economic theory and statistics—have, in turn, put major emphasis upon either the preparation of statistical series of average prices and price differentials, costs and margins or statistical analyses of aggregate supply and demand. Thanks to the efforts of workers in both fields, considerable progress has been made. First, an impressive body of institutional, technological and statistical data has been amassed. Second, methodology —particularly that of a statistical nature—has been gradually strengthened and its limitations more clearly recognized. Both types of developments have been (and will continue to be) essential to the understanding and improvement of the marketing system.

Nevertheless, the increasing tendency toward the divorcement of marketing and price research has led to undue neglect of their poorly cultivated but rich common ground. It is here that many of the really new and significant practical research problems lie. Here also one finds the basic core of general economic theory from which both fields should jointly derive their vitality and social usefulness in solving such problems. If, therefore, marketing and price research workers are to show real economic insight and perspective—either in the choice of important problems or in the use of effective methods of analysis—at least a partial reorientation toward this common ground would appear to be clearly necessary. Only thus can the frontiers of knowledge about the *economics*—as opposed to

* The writer is greatly indebted to many research specialists and administrators for their careful and often penetrating criticisms of an earlier draft of this essay.

the institutions and technology—of agricultural markets and prices be extended as rapidly as they need to be.

It is the purpose of the present essay to explore one of the important areas in which such fundamental *economic* research is badly needed. It is to be hoped that other research workers will outline other broad problem areas of equal significance,[1] in order that economists working in these research fields can meet the high standards of professional quality which the times demand.

II. *The Problems of Efficiency and Competition*

It is proposed here that we consider two broad and interrelated economic problems: (1) how efficient is the present marketing system? and (2) how competitive is its price-making? These are very practical questions about which we can as yet say relatively little. For that very reason, however, they are deserving of far more research attention than they have received in the past.

The objectives of such research should be several:

(1) to discover, for each market under investigation, the basic factors (economic and non-economic) which determine the actual levels of prices, margins, costs, investment, employment and output;

(2) to appraise the ways in which existing price policies and marketing institutions affect the interests of the farmer, the wage-earner and the general public; and

(3) to suggest institutional changes—legal or economic, public or private—by which the social performance of the given markets and marketing agencies could be improved.

If such comprehensive objectives are to be even partially realized, much more marketing and price research must be focussed upon

(1) the price-cost-output relationships within each type of marketing business unit (plant and firm) which contributes to the assembling, processing and distribution of any given farm product between farmer and consumer; and

(2) the price-making *process* in each successive market at which that product changes ownership.

The first of these focal points is principally concerned with *intra*-firm relationships; the second emphasizes the importance of *inter*-firm relationships between buyers and sellers, among buyers, and among sellers. In such a broad framework, the economic theories of markets, imperfect competition, consumption, produc-

[1] Among them, one would certainly have to include (1) consumption, income and demand; (2) supply analysis; and (3) the interrelations between general agricultural policy and the marketing system.

tion and uncertainty fall logically into place, suggesting fruitful avenues for empirical investigation and helping to assure that the institutional and technological data accumulated will be relevant to a broader body of economic principles. At the same time, by the constant interplay of theoretical hypotheses and actual data, more realistic refinements and suitable corrections of existing theory may be forthcoming.[2]

The remainder of this paper will be devoted to indicating some of the important types of research needed in determining the efficiency of, and nature of competition in, markets at different stages of the distribution process.[3]

III. *Some Research Needs in Local Country and Retail Markets*

In both country and retail markets—insofar as small, nonintegrated, independent marketing firms predominate—many of the actual imperfections of competition stem from imperfections of foresight, mobility, and knowledge.[4] The concept of a perfect market—if extended to embrace time, place and form[5]—therefore offers valuable criteria by which to judge the efficiency of actual markets in facilitating competition and the price-making process.

In view of the plethora of research funds which have been used in the study of local marketing operations, it is distressing how few projects have been formulated in such a way as to produce definitive answers to some of the most significant problems of country marketing. What are the nature and magnitude of existing market imperfections, particularly the spatial limitations upon the extent of the local market?[6] How far have these market imperfections in

[2] While the writer, like most agricultural economists, is primarily interested in theory as a kit of tools in the solution of practical problems, he believes that applied workers can, and should, contribute to the improvement of the tools themselves. The continuing interrelationships between economic and statistical theory and empirical supply-and-demand analyses offer one outstanding example of the fruitfulness of such cross-fertilization.

[3] The writer has not, for present purposes, made an exhaustive survey of past research in the fields covered below. Nevertheless, references are made to a limited number of research publications which the author has found particularly helpful in his own research planning. It should be emphasized, however, that these references are made for their illustrative value rather than for their inclusiveness.

[4] Because of space limitations, therefore, the writer has chosen to combine both types of markets here.

[5] See, for example, Geoffrey Shepherd, *Marketing Farm Products*, Iowa State College Press, 1946, pp. 399–409.

[6] Cf. the writer's book, *Imperfect Competition within Agricultural Industries*, Iowa State College Press, 1941, Ch. 13.

turn led to uneconomic scale of operations, non-aggressive price behavior, price discrimination, and other imperfections of competition? Finally, by what practical means would it be possible to correct for such undesirable imperfections as may be found to exist? There are already a number of research studies of country markets which have made important contributions toward the realization of these objectives.[7] These writings clearly indicate that the implicit or explicit use of the tools of economic theory can and should be put to the most meaningful and practical kind of use at the country level. It is also probably not too much to hope that, as such well-conceived projects in country marketing increase, agricultural economists may (as a by-product) be able to make some valuable contributions to economic theory, particularly in the fields of spatial competition and producer cooperation.[8] In the country market, one of the most significant unanswered problems is the place of multiple country-buying agencies, integrated with large-scale firms, in the local price-making process.[9] The theories of price

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[7] Among them might be mentioned: John D. Black and E. S. Guthrie, *Economic Aspects of Creamery Organization*, Minn. Agr. Exp. Sta., Tech. Bul. 26 (1924); J. M. Tinley, et al., *Creamery Operating Efficiency in California*, Calif. Agr. Exp. Sta., Mimeo. Reports No. 41 and 44 (1935–36); E. Fred Kohler and O. B. Jesness, *Minnesota Cooperative Creameries*, Minn. Agr. Exp. Sta., Bul. 333 (1937); R. G. Bressler, Jr., *Economies of Scale in the Operation of Country Milk Plants*, New England Research Council, Boston, June 1942; D. O. Hammerberg and W. G. Sullivan, *The Transportation of Milk*, Storrs Agr. Exp. Sta. Bul. 238 (1942); Bressler and Hammerberg, *Economics of the Assembly of Milk*, Storrs Agr. Exp. Sta. Bul. 239 (1942); Paul E. Quintus and Frank Robotka, *Butterfat Procurement by Creameries in Butler County, Iowa*, Iowa Agr. Exp. Sta. Res. Bul. 265 (1939); Geoffrey Shepherd et al., *Could Hogs Be Sold by Carcass Grade and Weight in the United States?* Iowa Agr. Exp. Sta. Res. Bul. 270 (1940); Shepherd and David G. Paterson, *The Proper Size and Location of Corn Stabilization Stocks*, Iowa Agr. Exp. Sta. Bul. 321 (1943); H. C. Woodworth and J. C. Holmes, *The Colebrook Plan for Milk Transportation*, N. H. Agr. Exp. Sta., Circ. 65 (1943).

[8] The importance of the market-area concept in fluid milk has already produced some useful applications of the theory of spatial competition. See, for example, John M. Cassels. *A Study of Fluid Milk Prices*, Harvard Univ. Press, 1934; E. W. Gaumnitz and O. M. Reed, *Some Problems Involved in Establishing Milk Prices*, U. S. Dept. Agr., Agr. Adj. Adm., Mktg. Info. Series No. DM-2; and Hammerberg et al., *Supply and Price Interrelationships for Fluid-Milk Markets*, Storrs Agr. Exp. Sta., Bul. 237 (1942). Much more needs to be done, however, in improving the highly unsatisfactory state of the underlying economic theory. For some attempts to explore the relationship of the economic theory of cooperation to the general theory of the proprietary firm, see Frank Robotka, "A Theory of Cooperation," this JOURNAL, Vol. 29 (1947), pp. 94–114; and I. V. Emelianoff, *Economic Theory of Cooperation*, privately printed, Washington 1942.

[9] Examples are *The Direct Marketing of Hogs*, U. S. Dept. Agr., Misc. Pub. 222 (1935) and Shepherd and Strand, *Local Hog Marketing Practices in Iowa*, Iowa Agr. Exp. Sta., Res. Bul. 262 (1939). The increasing tendency of purchasing cooperatives to integrate their operations back from the retail level also emphasizes the need for similar studies of the integrated marketing processes of private firms which *sell* to farmers.

leadership, price discrimination and geographical market-sharing would appear to offer important tools for this type of study.

Comparable problems, although largely unexplored, exist in the retail market, both rural and urban. As relatively large-scale consumers of feed, lumber, petroleum, fencing, agricultural implements and other production goods, farmers have a clearcut and direct interest in the extent of competition and efficiency of local distribution (both private and cooperative) of these products.[10] Here, there is a real opportunity for state research workers to apply the tools of economic analysis to easily accessible but new and important market problems. Most urban retail markets for farm and food products—being more remote from both producers and the land-grant colleges—have been badly neglected (even on the descriptive side) in view of the farmer's real interest in the efficiency of *all* stages of the marketing process. Since the retail margin is usually the largest part of the total costs of marketing—frequently exceeding all other marketing costs combined—it is here that some of the greatest possibilities for effecting significant savings in food distribution must lie.[11] Of particular interest, both economic and political, is the farmer's stake in the struggle among chains, super-markets, and independents in retail food distribution; and in such matters of public policy as chain store taxes, price maintenance, trade barriers and marketing agreements as they affect retail margins and consumption. In these areas, definitive analyses yet remain to be made. Analytical studies of the retail markets, prices and consumer preferences for specific farm products are also much needed if means are to be found for reducing margins, moving surpluses and promoting full consumption. Here, a regional approach—involving the collaboration of the several interested state colleges and the Federal Department of Agriculture—is most likely to produce comprehensive results and avoid needless duplication. At best difficult, such collaboration cannot, however, be stronger than its intellectual leadership.[12]

[10] Cf. Koller and Jesness, *Minnesota Cooperative Oil Associations*, Minn. Agr. Exp. Sta., Bul. 351 (1941).

[11] See, for example, *A Survey of Milk Marketing in Milwaukee*, U. S. Dept. Agr., Agr. Adj. Adm., Mktg. Infor. Series No. DM-1, 1937; and the several bulletins on retail milk delivery (Buls. 243, 247–249, 252–253) of the Storrs Agr. Exp. Sta., 1942–44.

[12] Although strengthened by the overwhelming interest of its region in fluid milk, the New England Research Council's outstanding success in coordinating and greatly strengthening the marketing and price research of several cooperating states has sprung largely from its series of well-trained and imaginative executive secretaries and the driving force of the Connecticut research group.

IV. *Some Research Needs in Central Wholesale Markets*

In the central wholesale markets, much research attention has been given to the description of various marketing institutions and market price behavior. However, research workers have as yet shown little interest in the analysis of the nature of competition among marketing agencies and the more fundamental factors underlying price determination in the wholesale markets. Here, it has frequently been assumed that the conditions of a perfect market are most nearly realized and, tacitly at least, that the conditions of pure competition prevail as well. The latter assumption, in particular, is especially open to question. During the last fifty years, both the wholesale buying and selling of farm products have come under the dominance of a few firms, which have increasingly integrated their operations back toward the producer and forward toward the retailer or consumer.[13] For example, it is not unlikely that as few as 3–6 meat and dairy corporations are now the direct source of 25–50 percent of the total cash income from agriculture in Iowa, Minnesota and Wisconsin; that three tobacco corporations account for 20–30 percent in Kentucky and North Carolina; and that three milk companies provide 20–30 percent of Vermont's agricultural income. The relative importance of these few large firms is, of course, far greater for many specific commodities.

There is nothing inherently evil in the present concentration of control in leading agricultural processing industries. It must nonetheless be clear that the price and production decisions of a relatively few firms have come to be of far-reaching importance (for good or evil) in the determination of wholesale prices and margins. Once this is recognized, research workers can hardly be content merely to study marketing institutions and functions in the abstract, apart from the basic economic unit, the individual firm; or prices and margins *per se*, without regard for the business decisions and practices by which they are arrived at. Here, surely, is an area—of vital interest to both farmers and consumers—which requires much more intensive and continuous research than it has yet received from marketing and price specialists. In fact, most land-grant colleges could very profitably use one or two able re-

[13] See, for example, R. K. Froker, A. W. Colebank and A. C. Hoffman, *Large-Scale Organization in the Dairy Industry*, U. S. Dept. Agr. Circ. 527 (1939); and the writer's *Post-War Developments in the Marketing of Butter*, Iowa Agr. Exp. Sta. Res. Bul. 250 (1939) and his *Imperfect Competition, op. cit.*, Ch. 4.

search workers in the economics of those agricultural processing-distributing industries (especially beyond the local assembling or processing stage) which are most important to their respective states.

Research in this field might well concentrate its attention upon two crucial issues:

(1) The extent to which large-scale organization has led to non-aggressive price behavior in the buying and selling of specific farm and food products, with possible deleterious effects (both short-run and long-run) on prices, costs, employment, and investment;
(2) The extent to which economies of scale have more or less offset any disadvantages stemming from increasingly oligopolistic market structures.[14]

If we are to come to understand the nature of the price-making process in wholesale markets, it will be necessary to focus far more research effort upon inter-firm relationships—particularly those among the dominant firms and between the few dominant firms and their smaller competitors in the given industry. The recent development of oligopoly-oligopsony theories—which emphasize the importance of the decisions of the individual firm in the pricing process—has clearly revealed how inadequate is our knowledge of the corporate structure of the principal agricultural processing-distributing industries and of the characteristics of the markets for their final products. Studies in this area are very much needed if we are to have a sound factual basis for making the choice of promising hypotheses from among the many possible ones suggested by economic theories of imperfect competition. At this stage, the principal objective is simply to discover possible *opportunities* for different types of imperfectly competitive behavior, on either the buying or selling side. The next step is to assemble all available qualitative and quantitative information which points toward the actual existence of such common market policies as sharing the market, price leadership, bilateral monopoly, product

[14] The research in this field, still in its rudimentary stages, has been almost entirely conducted by A. C. Hoffman and the present writer. See Hoffman's *Large-Scale Organization in the Food Industries*, U. S. Temp. Natl. Econ. Cmte., Mono. 35 (1940); Nicholls, *Imperfect Competition, op. cit.*, espec. Chs. 4–9, and "Imperfect Competition in Agricultural Processing and Distributing Industries," *Canad. Journ. of Econ. and Pol. Sci.*, May 1944, pp. 150–164. Hoffman has given strong weight to economies of scale relative to monopoly elements. The present writer, though recognizing the possible significance of large-scale economies, has primarily emphasized defections from competition.

and service differentiation, and price discrimination.[15] As difficult as it is to obtain adequate data in this area, the writer has been struck by the surprising amount of valuable material which can be obtained from public sources, such as trade journals, reports of government investigations, and court records.

Thus far, we have emphasized those aspects of the price and production policies of dominant firms which may be common to numerous industries, both agricultural and non-agricultural. Since generalization is an important objective of research, study of these common behavior patterns among industries is all to the good. Nevertheless, when we come to the third step—consideration of the probable social effects of actual policies found in particular industries—we must recognize that the same market pattern may conceivably lead to different results in different industries. This follows since, for many of our theoretical models (notably that of oligopoly), the solution is determinate—usually near or at the monopoly price level—only upon the basis of certain specific assumptions about the conjectures of business executives concerning the nature and extent of the interdependence between changes in their own policies and changes in their principal rivals.' While the available evidence would indicate that there are important similarities in these conjectures among various oligopolistic industries, we cannot simply assume that this is true. To do so is to overlook the supreme importance of the individual business decision in determining the *actual* outcome of a particular theoretical situation. We must, therefore, be aware of the differences as well as likenesses of price policies in different industries, making the fullest use of what theoretical tools we have, but being open-minded about their usefulness until we have explored the decision-making process in each industry in as intimate a way as conditions permit.[16] Only then should research workers draw their conclusions as to the extent that observed policies result in significant departures from the "socially optimum" levels of prices, margins, costs, profits, employment and investment.

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[15] Much of the writer's book, *Imperfect Competition* (*op. cit.*), is devoted to this part of the problem. Cf. also his two articles: "Market-Sharing in the Packing Industry," this JOURNAL, Feb. 1940, pp. 223–240; and "Post-War Concentration in the Cheese Industry," *Journ. Pol. Econ.*, Dec. 1939, pp. 823–845.

[16] Cf. the writer's "Social Biases and Recent Theories of Competition" (*Quart. Journ. Econ.*, Vol. 58 (1943), pp. 1–26), which contains a plea for a synthesis of the theoretical and institutional approaches to economic research problems.

If existing policies appear to affect adversely the interests of producers, wage earners and consumers to a significant degree, the final step of such an industrial inquiry must be consideration of means of improving the social performance of the industry under investigation. Such alternatives as dissolution of the large companies, control by consent decree or administrative regulation, government competition, producers' and consumers' cooperation, and distribution as a public utility would need to be considered in detail. Attention should, of course, be given to the provisions and administration of laws directed at the specific industry under study—for example, excise taxes, federal marketing agreements, and single-industry regulatory agencies. But, even more important, at least tentative conclusions should be reached concerning desirable reforms of more general social legislation—the anti-trust and patent laws, acts regulating commodity and security exchanges, labor laws, and the like. The farmer's stake in such legislation is obvious. Yet, only by the gradual accumulation of knowledge about the detailed economic functioning of a number of representative industries can generalized legislation be made either wholly workable or socially useful.[17]

A second crucial issue deserving research attention, particularly at the level of the central wholesale market, is the very broad question of the factors contributing to economies and diseconomies of large-scale business organization (including both horizontal and vertical integration) and the optimum size or sizes of plant and firm in the various agricultural processing-distributing industries. While closely related to the monopoly question just discussed (particularly to problems of social effects and desirable reforms), this area is sufficiently important to warrant specialized study on its own account.[18] Economists generally are largely split into two broad groups, one of which maintains that economies of scale are sufficiently great to justify a considerable degree of imperfect competition, while the other holds that their significance has been grossly exaggerated. Unfortunately, as widely divergent as are the

[17] Thus far, few if any studies of agricultural and other industries have been carried very far beyond the second of these four stages of industrial inquiry. The present writer would certainly not claim to have yet done so, although he is continuing to press in this direction. In fact, one of the writer's motives in urging others to give this subject careful attention is the hope that, through their stimulation, the quality of his own work might be improved.

[18] Cf. R. G. Bressler, Jr., "Research Determination of Economies of Scale," this JOURNAL, Aug. 1945, pp. 526–539.

policy implications of these two schools of thought, we have as yet little basis for knowing which of them is more nearly right. Nor can we know until research workers have carried through a number of thorough-going and well-conceived empirical studies of this important problem.

During the past decade, there have been a number of attempts to arrive at statistical counterparts of the shortrun cost and production functions of economic theory. The results have not only been of considerable interest in themselves but have in turn led to modifications of the underlying production theory, particularly in the incorporation of the concept of flexibility (necessitated by the uncertainties and fluctuations of the real world) into general economic theory.[19] Because of the peculiarly great uncertainties and fluctuations of output in most agricultural industries, there is an unusual opportunity for fruitful application of production theory to processing and distributing plants in such industries.[20] Thus far, most statistical studies have confined their attention to the shortrun functions of a single plant. It is also desirable, however, that concomitant attention be given to cross-section cost studies of plants or firms of different sizes in order that empirical approximations of *long*-run cost functions may be attained.[21]

Despite the time-consuming nature of quantitative research of these kinds, the diversion of more agricultural marketing research funds to this area would appear to be fully justified. The necessity of keeping abreast of the latest developments in statistical technique should also be emphasized. Finally, it must be recognized that—because of the lack of available statistical data, funds and adequately trained personnel—we cannot depend upon quantitative research alone to produce all the necessary answers on the nature and extent of economies of scale. If on a sufficiently high

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[19] The pioneering empirical work was largely carried out by Joel Dean, while the principal theoretical contributions were made by Stigler and Hart. For the citation of these and other publications and an excellent summary statement of the present state of development of this research field, see *Cost Behavior and Price Policy*, Natl. Bur. Econ. Res., Studies of the Conference on Price Research No. 4 (1943).

[20] Cf. the writer's forthcoming monograph, *Labor Productivity Functions in Meat Packing*, Univ. of Chicago Press 1948; and W. E. Paulson, *Cost and Profit of Ginning Cotton in Texas*, Tex. Agr. Exp. Sta. Bul. 606 (1942); as well as the works of Black and Tinley, cited above, n. 8.

[21] Cf. Bressler, *Economies of Scale . . . of Country Milk Plants*, *op. cit.*, *Cost Behavior and Price Policy*, *op. cit.*, Ch. X; Joel Dean and R. W. James, *Long-Run Behavior of Costs in a Chain of Shoe Stores*, Univ. of Chicago Journal of Business, Studies in Bus. Adm., Vol. 12 (1939).

analytical level, qualitative research has an equally important contribution to make to this significant problem and should be encouraged by every possible means.

V. *Conclusion*

In the writer's opinion, far too little attention has yet been given to fundamental economic research such as that suggested above. The reasons are several. First, many state and federal research workers are under constant pressure to perform urgent but ephemeral service functions for farmers and farm organizations. Such activities—useful as they may be in putting into practice much that is already known by marketing and price specialists—often hinder rather than facilitate more basic research on new and unsolved problems. Here, the obvious solution would appear to be an organization of research by which some of the abler research workers are sufficiently protected from day-to-day problems to permit them to take the long view.

Second, as is always true in any research field, specialists who have the imagination to choose significant problems and the ability to carry them to a successful solution are a scarce commodity. By an appropriate division of labor, however, it would be possible to create more positions which would attract and hold such workers and give them the opportunity fully to use their rare talents. Finally, marketing and price research has suffered from a shortage of personnel (particularly those directing research programs) adequately trained in general economic and statistical theory and the broader political and legal framework. The result has been an undue emphasis on extreme empiricism, routine and often repetitive description, and minutia. While this emphasis has produced many of the essential raw materials for more fundamental, comprehensive and well-conceived research projects, it has too frequently done so at the expense of—rather than in support of—the latter. In the recruitment and training of workers for the more basic types of research, therefore, the need for a thorough working knowledge of theory and the broad institutional framework should be given greater weight than has been customary in the past.

The Research and Marketing (Hope-Flannagan) Act of 1946 offers an unparalleled opportunity to correct the present shortcoming of agricultural marketing and price research. With this act, Congress has committed many millions of dollars to a greatly ex-

panded program of marketing research, extension and service during the next five years. If the future progress of agricultural marketing and prices is to measure up to this unprecedented financial support, fundamental economic research must be given a more important role. There is increasing evidence that it will not be. Most proposed research programs under the new Act appear, thus far, to be overwhelmingly concerned with improvements in market statistics and their dissemination; with finding markets for "distressed" commodities; with increased knowledge of the technology of grading, transportation, storage and industrial utilization of farm products; and with additional, wholly descriptive studies of marketing practices and institutions. Such matters are clearly important in their own right, hence worthy of the most generous financial backing. There is a real danger, however, that—because of the natural tendency to follow familiar paths instead of blazing new trails—more basic economic research will be permitted to go by default. Since 5–10 percent of the total available appropriations would probably provide ample support for fundamental research, such an outcome would be almost inexcusable.

New trails are never easy; many will prove to be blind alleys. But unsolved problems—if sufficiently great and lasting in their importance—warrant the taking of calculated risks in the use of research funds. It is believed that the types of projects here suggested are among those most deserving of such bold action.

MARKETING RESEARCH AND WELFARE ECONOMICS

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UNDERLYING the recent impetus provided by the federal government to agricultural marketing research appears to be the implicit assumption that alterations in the marketing structure—the methods or procedures by which the products of the farm are made available to consumers—can improve farm income. Title II, the "Agricultural Marketing Act of 1946," of Public Law 733 (79th Congress—chapter 966—2d Session), states in Sec. 202: "The Congress hereby declares that a sound, efficient and privately operated system for distributing and marketing agricultural products is essential to a prosperous agriculture and is indispensable to the maintenance of full employment and to the welfare, prosperity and health of the nation . . . it is the intent of Congress to provide for (1) continuous research to improve the marketing, handling, storage, processing, transportation and distribution of agricultural products."

An estimate of what Congress expects from this law may be obtained from an examination of Sec. 203. "The Secretary of Agriculture is directed and authorized:

"(a) To conduct, assist and foster research, investigation, and experimentation to determine the best methods of processing, preparation for market, packaging, handling, transporting, storing, distributing and marketing agricultural products. . . . "

"(b) To determine costs of marketing . . . and assist in the development and establishment of more efficient marketing methods (including analyses of methods and proposed methods), practices, and facilities, for the purpose of bringing about more efficient and orderly marketing, and reducing the *price spread* (italics suppled by the author) between the producer and the consumer."

"(c) To foster and assist in the development of new or expanded markets (domestic and foreign) and new and expanded uses and in the moving of larger quantities of agricultural products through the private marketing system to consumers in the United States and abroad."

It does not appear unreasonable to conclude that Congress expects this law to bear the fruit of expanded farm income. A similar expectation has been expressed in previous federal legislation dealing with agricultural marketing—the stimuli provided to farmers'

cooperatives and the Agricultural Marketing Agreements Act of 1937, for example.

It is the purpose of this paper to describe some of the ways by which the marketing structure might be employed to raise farm income. These will be evaluated in the light of "modern welfare economics"—a generally agreed definition of a welfare maximum. It is hoped that the analysis will suggest directions which agricultural marketing research might follow and aid in estimating the significance of such research.

A. Ways of Increasing Farm Income Through Changes in Marketing Procedures

There is a large number of different ways by which changes in marketing procedures could be used to increase farm income, most of which are being or have been utilized. Although the following classification is not exhaustive and the classes are not mutually exclusive, it includes the bulk of the possibilities:

(1) Increase marketing efficiency, preserving the existing specialization between "production" and "marketing." This means providing a given amount of services—for example, the same amount as are now provided—but providing these services with the use of fewer resources than are now employed.

(2) Increase the proportion of marketing services provided by farmers. With no change in the total of services provided and no increase in marketing efficiency, the services provided by "middlemen" would be reduced. Farmers would be selling more of their resources indirectly in the provision of marketing services.

(3) Reduce the number of marketing services. This is, of course, a change in the nature of the product provided to consumers.

(4) Permit farmers to achieve (or strengthen) "monopoly power." This would mean a change in the "terms of trade" between farmers and the buyers of farm products—consumers or "middlemen."

(5) Reduce the "monopsony power" of the buyers of farm products—consumers or middlemen—thereby increasing the prices received by farmers.

Obviously, an alteration in marketing technique might involve many of the classes of changes suggested above. For example, the introduction of a large farmers' selling cooperative might increase marketing efficiency, increase the number of marketing services provided by farmers through the cooperative, reduce the number of

marketing services added to the raw material, strengthen farmers' "monopoly power" and diminish the "monopsony power" of buyers. But, for purposes of this analysis, it is useful to employ a classification such as is set forth above.

It is interesting to note that any of these changes might reduce the spread between prices paid by consumers and prices received by farmers. Consequently, to the extent that not all of these changes are consistent with our definition of an improvement in welfare, a reduction in the spread between prices paid by consumers and prices received by farmers is not an adequate criterion for appraising changes in the marketing structure.

1. *Increasing Marketing Efficiency*

It is not unfair to credit many research workers in marketing, both in the industrial and agricultural fields, with attempting to increase marketing efficiency. They have attempted to point out ways in which fewer resources would be required to provide a given amount of services, or conversely, more services could be provided with the same resources. Developments in food processing—canned and frozen fruits and vegetables for example—have been mostly increases in efficiency. This is partially a technological phenomenon. It is economic only if, with a given technology, the marketing process is induced to employ the proper (most profitable) combination of resources.

The effects of increases in marketing efficiency, however, need not be reflected in significantly higher farm income. In the short-run, they may result in higher returns to processors—prices paid by consumers and prices received by farmers remaining relatively unchanged until knowledge of such improvements becomes more widely disseminated, a patent expires, or other impediments to widespread use of the new process are broken down.[1]

In the long-run, the benefits of such improvements are likely to

[1] A change in the form of the production function, which increases the marginal physical product of a factor, will increase the demand for the factor and hence will increase the price of a given quantity which is purchased—if the supply is not perfectly elastic. In one year, the quantity of an agricultural product can be taken as fixed. An improvement in marketing efficiency in one sector of the market for this product would increase the price of the agricultural product only in so far as the firms in this sector would bid higher prices in order to get additional supplies from other sectors. If the sector in which the improvement occurred uses a relatively small percentage of the total of the agricultural product, the price increase is likely to be small.

be widely disseminated among the population, accruing to farmers in about the same fashion as they accrue to other groups of economic units owning similar amounts of resources. Thus, a change which cut vegetable marketing costs in half would permit consumers to secure a given amount of vegetables of a given quality at reduced prices—provided that middlemen's profits were not expanded to absorb all of the gains and that some expansion in the supply of vegetables would occur as a result of increased prices to producers. Unless, however, the vegetable producers were able to prevent expansion among themselves and the entry of new producers, their costs would increase as they bid for additional resources. Their returns would be increased only as the real prices for resources throughout the economy were raised as a result of the improvement in marketing.

2. *Increasing the Proportion of Marketing Services Provided by Farmers*

Another way by which farm income might be increased through changes in the marketing structure is by making it possible for farmers to perform some of the functions which otherwise would be performed by middlemen. For example, farmers might market butter rather than cream, pasteurize and bottle fluid milk and deliver it to the household consumer, or even make shoes. One interpretation of the belief that a reduction in the spread between prices paid by consumers and prices paid by farmers is a "good thing" is that it would be desirable for farmers to perform more of the marketing services now performed by middlemen.

It is reasonable to expect that some marketing services could be performed as efficiently, or perhaps more efficiently, by individual farmers than by specialized marketing agencies. Where the optimum size marketing unit has a capacity about equal to the output of a single producing unit (farm), there are likely to be few gains from a division between production of a raw material and marketing of the product to consumers.

Such instances, however, are relatively infrequent. The optimum size processing or distributing unit is likely to have a capacity several hundred times the output of a single farm. In such cases, the resources of several hundred farmers would have to be jointly mobilized in the establishment of a marketing agency.

In assuming some of the functions ordinarily performed by

middlemen, the farmer may be able to employ resources that he would prefer to use but for which there is no market. Some labor resources would fall in this category. A few hours each day may be spent by the farmer in leisure, although he would prefer to sell the services of his labor during this period. For example the fluid milk producer-distributor is frequently taking advantage of an opportunity to employ resources which would otherwise be spent in leisure. In such instances, improved use of resources may be a result of an expansion in the proportion of marketing services assumed by farmers—providing that the displaced middlemen can find employment elsewhere and that their product in this new employment is not too much smaller than that in the old.

However, when the optimum size processing or distributing unit is large and its operation requires the cooperation of many farmers, the farmers' resources which are used in this unit are unlikely to be labor. A cooperative grain elevator, for example, is infrequently manned by farmers. Farmers furnish the funds to purchase the equipment necessary to handle the grain and the funds to finance marketing operations. Such funds, if invested in the farm enterprise, might yield returns as high or higher than those yielded by the marketing enterprise.[2] A decision to invest in a marketing enterprise should be made with full knowledge of returns from alternative investments including those in the farm business.

3. *Providing Fewer Marketing Services*

Implicit in many marketing analyses is the notion that there are too many services attached to the raw material before it is finally converted into a form that is purchased by consumers.[3] An example to which marketing experts frequently point is retail fluid milk distribution with its many distributors following the same geographical path in delivering fluid milk to households. It is contended that consumers would be willing to pay almost as much for a

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[2] Empirical estimates of marginal productivities in agriculture, indicate that the productivity of capital resources in agriculture as a whole is relatively high. See, for example, D. Gale Johnson, "Contributions of price policy to the Income and Resource Problems in Agriculture," this JOURNAL 26: 631–664; and Gerhard Tintner and O. H. Brownlee, "Production Functions Derived from Farm Records," this JOURNAL 26: 566–571.

[3] See, for example, Geoffrey S. Shepherd, *Marketing Farm Products*. Ames, Iowa 1946. The Iowa State College Press; John D. Black, *Agricultural Reform in the United States*. New York, 1929. McGraw-Hill Book Company, Chapter XVIII; *Does Distribution Cost Too Much?* The Twentieth Century Fund. New York, 1939.

product with much less services—less elaborate packaging or less advertising for example. This notion is not universally held, however. Note the extensive advertising campaign which is being planned by the National Dairy Association.

Whether this belief has empirical validity is difficult to determine. Frequently consumers have only the alternatives of purchasing the commodity with its many services or not purchasing. The alternative of fewer services is not available. Perhaps some of the funds for marketing research might be spent in determining consumers' preferences for various amounts of marketing services.

If this belief is valid, however, it does not necessarily follow that the reduction in marketing services will provide substantially higher farm income. A reduction in marketing services resulting in an essentially equivalent product in the eyes of the consumer is analogous to an increase in marketing efficiency. Fewer resources are required to produce a given amount of consumer satisfaction, or more satisfaction may be attained from a given amount of resources. Farmers, in the long-run, are likely to benefit from this step only as the real prices for resources throughout the economy are raised. Unless farmers were able to prevent the entry of new producers, the impacts of the reduction in marketing services are likely to be disseminated widely throughout the economy.

Of course, if consumers prefer the existing pattern of marketing services, reducing the amount of services would reduce farm income. The demand prices for farm products would fall by more than the reduction in marketing costs.

4. *Strengthening Farmers' Monopoly Powers*

An important characteristic which distinguishes a firm selling in a competitive market from a firm which is the sole seller in a market is that the former may follow only an output policy while the latter may have *either* an output policy *or* a price policy.[4] The monopolist may pursue a price policy which will result in profits in excess of those which would be achieved in a competitive market. By prohibiting entry of other firms, he is able to maintain this high profit position. The competitive firm, however, must take the market price as given and adjust his output to make the best of the situation.

[4] If the demand schedule for the product is given, it is obvious that the monopolist cannot fix both price and output. If one is fixed, the other is determined by demand conditions.

Farmers have long pointed to their market situation as one in which sellers told them what prices they (the farmers) would have to pay, while buyers of farm products told farmers what prices would be received. While farmers perhaps have had an exaggerated view of the degree of monopoly and monopsony in their markets, this has not weakened their zeal for achieving a monopoly or monopsony position. Encouragement has been provided by government through such legislation as the AAA and the Agricultural Marketing Agreements Act.

To achieve monopoly power would require something similar to the formation of a selling agency which would determine either price or output policy, allocate quotas to producers and establish machinery to enforce these quotas. Although the problems of allocating and enforcing quotas might be difficult to solve, it is conceivable that rather marked gains to farmers might accrue if these problems were overcome. This is particularly true for commodities for which the price elasticity of demand is less than unity within the "effective range." In such cases, total revenue could be increased by reducing marketings. In other cases, total revenue would fall as marketings were reduced. Total costs would have to fall more than total revenue before farmers as a group would gain.

Further opportunities for increase in total receipts from a given output of a farm product could be provided through monopolistic price discrimination[5]—selling the same product in different markets at different prices. This is essentially the effect of the classified pricing system for milk which prevails in most federally administered milk markets.

In virtually all cases, farmers stand to gain from practicing monopolistic price discrimination. They may also gain from simple monopoly power in all cases where total revenue will be increased by reducing the amount sold. And they gain when total revenue declines with reductions in the amount sold, but total costs decline even more—the optimum quantity, from the farmers' standpoint, being that at which any further reduction in quantity sold reduces total revenue by more than it reduces total cost.

5. Breaking the Monopsony Power of Buyers of Farm Products

The formation of farmers' selling organizations is frequently designed to break the monopsony power of the buyers of farm

[5] Refer to Joan Robinson, *The Economics of Imperfect Competition*. London, The Macmillan Co. 1938, Chapters 15–16.

products. A milk distributor who is the sole buyer of fluid milk in a given marketing area and who is attempting to maximize his profits will hardly be unaware that his purchasing operations are an important influence in the milk market. If he is trying to maximize his profits, he will attempt to equate the marginal revenue product

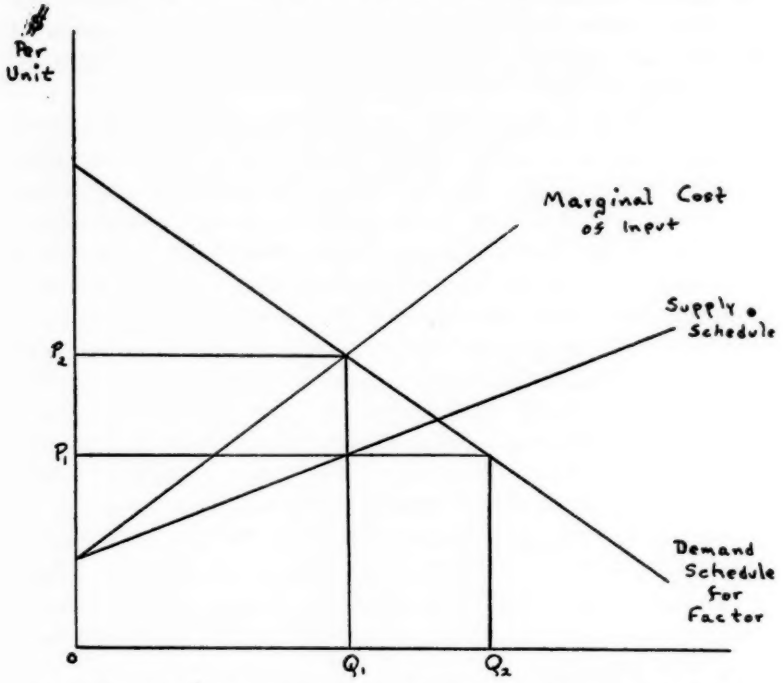

FIG. 1. UNDER SIMPLE MONOPSONY, THE PRICE OF THE FACTOR WILL BE OP_1 AND THE QUANTITY PURCHASED WILL BE OQ_1. IF THE PRICE IS FIXED AT OP_1, THE QUANTITY WILL BE INCREASED TO OQ_2, OR OQ_1 WILL BE PURCHASED IF THE PRICE IS FIXED AT OP_2.

(marginal revenue from milk which he sells multiplied by the marginal physical productivity of the milk in the form in which it is purchased from farmers) with the marginal cost of fluid milk to him. But, unless the supply schedule of milk in the market in which he is purchasing is perfectly elastic, the marginal cost of fluid milk will not be equal to the price (see figure 1).[6]

The monopsonist also may be able to practice price discrimination in the purchase of milk from producers—those producers

[6] Refer to Joan Robinson, *ibid.*, Chapters 18 and 26.

having the strongest bargaining positions receiving higher prices than producers with weaker bargaining positions. Such discrimination will be profitable to him providing that the sellers can be separated from each other.

The formation of a producers' selling organization to fix a price at which all milk would be sold, or price fixing by government, would destroy the monopsony power of the buyer. The supply schedule facing him would become perfectly elastic at the fixed price. Producers would receive a higher price for the same quantity as was sold before the uniform price was established, or they would receive the same price for a larger quantity (see figure 1). If the price was established so that the quantity previously sold continued to be purchased by the distributor, consumer welfare would be unaffected. A transfer to income from the milk distributor to producers would result. It probably would be necessary for the farmers' selling agency or government to establish quotas for individual producers in order to prevent excess supply of milk. If, however, supplies are permitted to adjust to price, the price of milk to consumers is likely to fall. Consumers will share in the benefits of the destruction of the distributor's monopsony power. A "better" allocation of resources—one more in accordance with consumers' preferences and producers' costs—will be the result.

B. A Welfare Maximum

Modern welfare economics is concerned with defining the conditions under which the welfare of a group of economic units—the producers and consumers of the U. S., for example—is at a maximum.[7] Most contemporary writers in welfare economics do not admit interpersonal comparisons of utility. Hence, the optimum distribution of a *given* income cannot be defined, although the effects of income distribution upon the size of the product to be distributed can be analyzed. This admits consideration of the impacts of income distribution upon the level of employment (the amount of resources used) and upon the allocation of resources.

[7] For some of the more recent ideas relating to welfare economics, refer to Abba P. Lerner, *The Economics of Control*, New York, The Macmillan Co. 1946; J. R. Hicks, "The Foundations of Welfare Economics," *Economic Journal* 49: 696–712 (December 1939); Oskar Lange, "The Foundations of Welfare Economics," *Econometrica*, 10: 215–228 (July–Oct., 1942); T. de Scitovsky, "A Note on Welfare Propositions in Economics," *Review of Economic Studies*, 9: 77–88 (November 1941); Melvin W. Reder, *Studies in the Theory of Welfare Economics*, New York, Columbia University Press, 1947.

Assuming a given distribution of income, any change which permits an increase in the size of the total product (including leisure) of the economy can be considered an improvement in welfare—provided that the economic units which gain compensate for the losses of those which lose as a result of the change. Thus, welfare for the economy as a whole is at a maximum when no further increase in welfare can be achieved by an economic unit without this action resulting in a reduction in the welfare of other units.

With a given income distribution, a given amount of resources to be allocated among various alternative uses (including leisure), and given consumer preferences, resource allocation is optimum (i.e., will permit maximum welfare) when the marginal rate of substitution between factors and products, between products, and between factors is the same for all firms, resource owners and consumers. This is equivalent to saying (1) that the output (or input) of any firm should be such that the marginal physical product of a factor, A, in producing a product, X, is the same as for all other firms and is equal to the marginal rate of substitution of A for X in all households; (2) that the marginal productivity of another factor, B in producing X is the same for all firms and is equal to the marginal rate of substitution of B for X in all households; (3) that the marginal rate of substitution of factor A for factor B should be the same in all firms and all households; (4) that the marginal rate of substitution of product X for product Y should be the same in all firms and all households.

Achievement of this condition in automatically encouraged by the price mechanism under perfect competition. In the long-run, firms equate the value of the marginal product of a resource with the price of the resource, the marginal rates of substitution between factors with the factor price ratios and the marginal rates of substitution between products with the product price ratios. Households—if they are maximizing their utilities subject to the constraints imposed by their incomes—equate the marginal rates of substitution between products with the product price ratios, the marginal rates of substitution between factors with the factor price ratios and the marginal rate of substitution between a factor and a product with the factor-product price ratio. This condition is not fulfilled, however, when there are imperfections—monopoly and monopsony, for example—in the economy. This does not mean that

monopoly in an economy is inferior to a perfectly competitive situation where the technology which can be utilized by the monopolist is sufficiently superior to the technology used by the competitors to make the product of the economy with the monopolist maximizing profits greater than the product of the economy under perfect competition. But it does suggest that welfare could be increased by inducing the monopolist—through price regulation, taxation or subsidization—to equate the product price with the marginal cost of the product. The monopolist could be compensated by consumers and resource owners for the reduction in profits which he would suffer, and consumers and resource owners would still gain.

Although modern welfare economics does not lend itself to telling us what the income distribution should be, it can aid us in appraising various methods for achieving any distribution of a given income.[8] We might assume, for example, that Congress is accurately reflecting public opinion in trying to increase farm income. If we can determine what income the public thinks farmers should receive, we can evaluate various methods of achieving this income in terms of their impacts upon the welfare of the other members of the economy. Given the income which farmers should receive, the best method for providing this income is that which leaves the welfare of the rest of the economy at a maximum. That method, according to the criteria which have been set forth above, will be the one which interferes least with an allocation of resources most in line with consumer preferences—leisure being accepted as a product thereby permitting the level of employment as a policy consideration.

C. Appraisal of Various Changes in Marketing According to the Criteria of Welfare Economics

Of the five general classes of changes in the marketing structure which might be employed to increase farm income, one—the building up of farmers' monopoly power—obviously does not meet the conditions which have been set forth as representing a welfare maximum. Farmers could be made as well off by other means—direct income payments, for example—and the rest of the economy

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[8] This is the approach taken by Professor T. W. Schultz in his analysis of agricultural policies. Note, for example, "Economic Effects of Agricultural Programs," *American Economic Review* (supplement) February 1941, 127–154.

would be better off than if farm income were increased by the monopoly device.

One class of changes—greater marketing efficiency—could fit our definition of an increase in welfare. Since the size of the total product would be increased, farmers could capture all of the benefits of the improvement and leave the rest of the economy as well off as before. The "best" method for transferring the gains to farmers—i.e., that method which maximizes the size of the transfer subject to the condition that the rest of the economy be left no worse off than before, or which maximizes the welfare of non-agriculture subject to a given size transfer to farmers—is not through the price mechanism. If farmers try to capture the gains of increased marketing efficiency through maintaining prices to consumers, the conditions for a welfare maximum set forth in the previous section cannot be met. Transferring income through income taxation and income payments would be a superior method.

Whether the three other types of changes mentioned would result in an improvement or reduction in welfare cannot be determined without further specification of the conditions under which these changes take place. Increasing the proportion of marketing services provided by farmers—if it increases the size of the total product and farmers compensate for the welfare losses of the displaced middlemen—would represent a welfare gain. If there was full employment of resources before and farmers performed the marketing services less efficiently than middlemen, the result is a decline in welfare. Providing fewer marketing services would increase welfare, if the resources released for other uses contributed more in these other uses than they did in marketing.

The destruction of the monopsony power of buyers of farm products would result in increased welfare providing that the output of farm products was increased, this increased output was sold in a "free" market and the monopsonist was compensated for his loss in welfare. This follows from the improvement in resource allocation, the consequent increase in total product and the resultant opportunity for compensation to the monopsonist with the compensators (farmers and consumers) still being better off than before. If, however, the breaking of monopsony power results only in a transfer of income from the monopsonist to farmers, consumers remaining no better off than before, farmers would not benefit after arrangements had been made for compensating the monopsonist.

No improvement in welfare would result. This conclusion must be modified if society believes that an income distribution with farmers getting more and the monopsonist less of a given product is preferable to a distribution in which farmers get less and the monopsonist more.

D. Marketing Research

Most of the implications of this analysis for marketing research are rather obvious. A given amount of funds are to be spent on marketing research—a situation resulting from the Agricultural Marketing Act of 1946. These funds will contribute most to the welfare of the economy as a whole if they are devoted to discovering means for improving marketing efficiency, determining the preferences of consumers for various amounts of marketing services and devising acceptable means for breaking the monopsony power of buyers. The funds will not be well spent if they are devoted to means for increasing the monopoly power of farmers.

Allocating resources for research, however, is an economic problem. Resources are best used when their contribution to the total product of the economy is at a maximum. The resources used for marketing research are frequently resources that could be used for other purposes. Although one cannot forecast accurately in advance the results of research, relevant factors in the assessment of any research project are (1) the probability of solving the problem and (2) the magnitude of the problem to be solved. The probability of solving the problem is the factor which cannot be known in advance.

The probability of obtaining reasonable solutions to many of the problems of agricultural marketing may be relatively large, provided that enough resources are directed toward solving these problems. The significance of solutions to the problems, however, may be relatively small in terms of the effects upon the welfare of either farmers or the economy as a whole. Farmers stand to gain from improvements in technology and improved resource allocation in sectors of the economy other than agriculture as well as in agriculture, and they also stand to gain from maintenance of full employment. Five million people involuntarily unemployed for one year means a reduction of as much as $10 billion in national product. Cutting agricultural marketing costs in half—preserving the same amount of marketing services as are now provided—would

not increase the national product by such a figure. And such a reduction in marketing costs is beyond the wildest dreams of those who conceived the Agricultural Marketing Act of 1946.

It would have been well to have spent a bit more time in surveying problem areas and arraying these problems according to relative importance before embarking upon such extensive researches in the field of marketing. While it was not we as agricultural economists who made the decision to expand marketing research, it is our function as economists to help Congress evaluate the importance of various problems which may be solved by additional research. We need to continuously take stock of our research, keeping in mind the probable importance of our contributions. Perhaps we are determining our allocation of research resources too much by what may have been significant when our field was being developed and have failed to note the growth of new and conceivably more significant problems.

THE UNRRA EXPERIENCE IN RELATION TO DEVELOPMENTS IN FOOD AND AGRICULTURE*

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SINCE Professor Schultz addressed the last annual meeting of this Association just eight months ago on the subject of international postwar policies in food, agriculture, and trade, two developments of overwhelming importance with relation to these fields have occurred. On the one hand, it has become obvious that the United Kingdom loan has failed in its objective of restoring the British economy to the point where the U.K. could hope to maintain her balance of payments without employing such arbitrary devices as now used. On the other hand the implications of the cessation of UNRRA and the necessity of developing alternative relief and recovery measures have come to the fore. These center around the Marshall Plan, to some extent around the Greek-Turkish aid program, and the extension of credits by the World Bank and by individual Governments.

Dealing with the first of these matters, namely the failure of the U.K. loan to achieve its purposes, *The Economist* in its issue of 30th August, 1947 states: "The Government have said, in effect, that there is no hope of solving the problem of the British balance of payments before 1952, and probably not then." On another aspect of this same general problem I quote from the *Financial Times* of London of 3rd September, 1947 "Her (the American) dreams of multilateral trade and multilateral convertibility of currencies, on which hopes of a prosperous American economy have partly been based, are being shattered by the hard realities of the world dollar shortage and the quickening drift toward bilateralism."

It is against such a background that I wish to pursue my appraisal of the UNRRA experience, and my discussion of its place in the field of postwar developments in food and agriculture. As I proceed I wish to ask at each step whether the UNRRA experience has been of help in solving the problems of the transition from the

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** In the preparation of this paper the author had valuable assistance from several former UNRRA colleagues, particularly from R. H. Allen and Andrew Cairns.

immediate postwar to a period of greater stability. It is notable that the difficulty of the present transition period, not only with relation to the dollar shortage, but more broadly, was foreseen by Dean Williams of Harvard University. His substantial reservations to the Bretton Woods Agreements related especially to their failure to deal adequately with the difficulties of the transition period. Professor Myrdal has also stressed these difficulties in his writings.[1]

Turning then to the UNRRA experience we cannot and I certainly do not wish to avoid the most severe criticisms of UNRRA—provided these criticisms are fair and that they have basis in fact. However, I say reluctantly that there has not been full and fair reporting of UNRRA activities in Eastern Europe. I am reminded when I consider this question of the seven Protestant ministers who recently signed a unanimous report charging new handling agencies with " . . . misrepresentation and outright falsification" of news on the question of religious freedom in Jugoslavia.[2] I do not make similar charges regarding reporting on UNRRA; nor do I hesitate to say that there has been less than full and fair reporting on UNRRA activities.

Regarding this controversial organization it is necessary, I believe, to establish certain basic facts on which almost all people who participated in the work of, or who observed UNRRA closely, would agree. The first of these is that it was the greatest international undertaking directed towards peace ever conceived. The nations participating gave up great power to an international body staffed by international civil servants. Along with the power given obligations were imposed on the Administration. It was required to assess needs and to procure and ship supplies strictly in accordance with these needs, disregarding entirely considerations of creed, politics, and other such bases for differentiating peoples. It should be noted that those countries which came through the war with foreign exchange resources were excluded by the original UNRRA agreement from receiving supplies. For this reason the Northwestern European counties were not recipients of UNNRA aid. Furthermore, it should be noted that while UNRRA was originally established to provide aid for the Allied countries which were victims of war, and which could not pay for their own relief and

[1] Cf. The Reconstruction of World Trade and Swedish Trace Policy in Supplement B to *Svenska Handelsbankens Index* December 1946.

[2] The *Chicago Sun*, August 13, 1947.

recovery, Austria and Italy were made to qualify for UNRRA assistance by a special UNRRA Council resolution.

Another fact regarding UNRRA is that its total resources were approximately three and one-half billion dollars—an amount trifling in comparison to the devastation visited on the war ravished countries. This latter figure has been estimated at approximately 350 billion dollars. At no time did anyone believe that the UNRRA resources would anywhere approach minimum needs. The sum stated above should be considered against the approximately twenty billion dollars called for in the Marshall Plan which is faced with a smaller relief and recovery responsibility than was UNRRA. With such limited resources and tremendous responsibilities all that could be considered by UNRRA was a little pump priming aimed at stimulating rehabilitation on the basis of employing the indigenous resources of the receiving countries.

The Nature of and Contributions of the Program

The UNRRA program consisted of five distinct parts: Those covering food, agricultural rehabilitation, industrial rehabilitation, clothing and medical aids. (This neglects entirely such work as that with displaced persons.) The food program which entailed the expenditure of 1.2 billion dollars involved the establishment of requirements, the determination of a food program for each receiving country, securing allocations, and then arranging for procurement and shipment of the supplies. I should say that on the allocation question the Combined Food Board and UNRRA were generally at odds. The UNRRA point of view was that the CFB suffered from the fact that it had no international secretariat, that some forty nations members of UNRRA were made subservient on questions of supply to two or three nations. There is no doubt that the priorities established by the Board during the UNRRA period were: First, the United Kingdom, second, the Western European countries, and third UNRRA countries.[3]

In this brief review of the UNRRA food program I should not fail to mention the long struggle on the question of stock piling relief supplies. This was defeated largely by the bare shelf policy followed by the United States. This policy, the first distinct indications of which were clear even in the second quarter of 1944, had its

[3] The question of the handling by the CFB of allocations for Liberated Areas will be dealt with in a subsequent paper by this writer.

origin in the fears that large surpluses would arise at an early date.[4] Even three and one-half years later these surpluses are hardly evident. Lt. Colonel Olmstead, then Deputy Director of the War Food Administration, reported to a Congressional Committee, with the air of a job well done, that from January 1, 1944 to January 1, 1945, the inventories of the Department of Agriculture which acted as the U.S. procurement agency for Lend-Lease, UNRRA, etc., were cut by fifty percent.[5] Many Department of Agriculture personnel were neutral and some clearly hostile to procurement for UNRRA. Olmstead, for instance, stated on 6th May, 1944 that "although WFA is constantly asked by relief organizations and well wishers to build up a stockpile of foods which can be used to relieve foreign countries immediately after the war, WFA has no intention of increasing its holding at the present time, on the basis that its present inventories may well fill the relief demand and more."[6] To illustrate further the lack of responsibility felt by some American officials, I cite that on 6th February, 1946, the day before President Truman very soberly announced the seriousness of the European food crisis, Secretary Anderson addressing a trade association on the American food position made no mention of the United States responsibilities for sending food abroad and in closing his address emphasized the statement that: "*America must eat better.*" While I point to these tragic shortcomings, it gives me great pleasure to state that within a month of the Anderson statement the United States was getting under way an excellent program for alleviating the food crisis of the Spring of 1946—a program without equal in any country.

Regarding the food which UNRRA purchased, the first rule was to procure the cheapest possible food in terms of nutrient values. Thus, grain represented number one item on UNRRA's food list, accounting for over forty percent of the expenditures on food. In meat cheap cuts were the basis of the program, with canned and

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[4] Cf. Walter Wilcox, *The Farmer in the Second World War.* Quoting from page 282: "While the War Food Administration was dropping one food consumption restriction after another in the summer and fall of 1944 in the fear of accumulating surpluses, Tolley pointed out that current government policies would lead to an international crisis when relief feeding became necessary." "In spite of several warnings, the 1944 food management program was based on a 'bare shelf' policy. The early 1945 repercussions of this policy have already been mentioned. But soon after V. J. Day, the bare shelf policy was adopted again."

[5] 79th Congress, House of Representatives, Sub-Committee on Appropriations.

[6] *New York Journal of Commerce*, 26th May, 1944.

pickled horse meat very important items. However, I should mention that the Russian Republics receiving UNRRA aid, having fancier tastes, insisted strongly on getting Tushonka, a product which cost UNRRA from 36 to 44 cents per pound, more than twice the price paid for other meat purchased by UNRRA. Pickled and dried fish were also important among the animal proteins. Dairy product procurement was aimed at meeting the minimum needs for children, and nursing mothers. The program for the procurement of fats was very modest, but even this could not be met to more than a very limited extent due to the shortage of fats. A small amount of UNRRA money was used in the purchase of dried fruit, pulses and sugar.

In closing these comments on the UNRRA food program one should not fail to mention that UNRRA was considered by many governments to be a desirable dumping ground for supplies for which no other market was readily available. However, while UNRRA cooperated fully in taking any food which had good nutritional value, we did not like taking canned vegetables, dehydrated potatoes, etc., which were very costly in the terms of the food values; further, we resented particularly having to take such supplies under political pressure.

The Agricultural Rehabilitation program of UNRRA involved an expenditure of about 334 million dollars. The circumstance which underlay this part of UNRRA's program was that some 10 million head of cattle and horses in UNRRA European receiving countries were lost through the devastation of war. Thus, not only was draft power very limited but natural manure was not available in anything near normal quantities for fertilizing purposes. These circumstances were especially serious since there was an urgent need to grow cereals and potatoes, the important calorie foods, in the immediate post-war period. These crops when grown on a large proportion of the tillable land are rapidly soil depleting in those countries where UNRRA had a responsibility. Summarizing the program of agricultural rehabilitation in financial terms, we find 68 million dollars expended on farm machinery, 58 million dollars on livestock, especially draught animals, 52 million dollars on fertilizer, 51 million dollars on feed and 41 million dollars on fishing equipment.

I shall not deal with the other phases of the UNRRA program since they were not concerned with matters of food and agriculture.

I should like to turn now to dealing with the contribution which UNRRA supplies made to the receiving countries. In the first place was the prevention of famine, especially in Europe in the Spring of 1946; secondly, was the maintenance of minimum, and I am afraid generally very minimum levels of food, clothing, and medical aids; thirdly, was some development of transport and industry; fourthly, was the contribution made by providing the services of technicians. Most important, however, of all the contributions was that of helping to stabilize the finances of the governments and to add strength to the governments themselves. The receiving countries were permitted to sell UNRRA suplies under explicitly defined conditions and to use the proceeds as a government revenue. Another contribution which UNRRA made was in helping to start the flow of trade between European countries. While these contributions have been important, we must not fail to note that on diets which averaged nationally approximately 2,000 calories per head per day in 1945 and 1946 limited rehabilitation was possible. The 2,000 calory national average means that large groups in such a country would be receiving 1,500 calories or less per head per day. (These figures compare with 3,200—3,400 in the United States and Canada, and levels nearly as high in the United Kingdom.)

Consequences of the Termination of UNRRA

I turn now to the question of the implications involved in the termination of UNRRA. On August 8, 1946, while famine still laid its hand on many parts of Europe and Asia, a Council resolution of United States origin calling for the early termination of UNRRA was passed. Obviously, this was not done because the relief job was completed; nor was it done because UNRRA was inefficient. It was done because the United States insisted on placing itself in the position of being able to grant or withhold aid on grounds other than need. At this point the procedure of feeding people, idealogical friend and enemy alike, and being concerned about their politics afterwards, came to an end. As a Canadian I do not hesitate to express my regret that Canada joined in sponsoring this resolution which terminated UNRRA. The United Kingdom also undertook joint sponsorship. However, the U.K. or at least some of its cabinet ministers repented somewhat, for in July of this year, the Hon. Philip Noel Baker wrote to the Director General of UNRRA as follows: "I need not say that that fact (the termination of

UNRRA) causes me a good deal of nostalgic pain, with perhaps even some remorse. I still believe that the best plan for the Governments last year would have been to give another one third percent. (of their national incomes) to UNRRA. I was beaten, and therefore we had to adopt the second best, developed in the 'post-UNRRA' debate in the Assembly."[7]

Restating the point made earlier, the termination of UNRRA meant the ending of post war aids on the basis of need, and substitution of the granting of aid on the basis of consideration other than need. The termination lost for relief almost all of the thirty percent contributed by nations other than the United States. Canada, for instance, gave generously to UNNRA, and since its termination has contributed only 20 million dollars towards relief. This is in contrast to 154 million dollars granted through UNRRA. Unquestionably if UNRRA had been permitted to continue, the Canadian House would have voted another one percent contribution by a large majority. The ending of UNRRA has the further consequences of putting the United States in the position of appearing to give special consideration to two ex-enemy governments, supporting a corrupt and unrepresentative government in Greece, not to mention Turkey. Some of these unfortuante consequences would not likely have occurred if provision had been made to continue UNRRA, the only international organization with which Russia was cooperating effectively and an organization against which no serious charge of corruption or political favoritism was ever established. This statement does not suggest that UNRRA did not make important mistakes.

Turning for a moment to the mistakes of UNRRA, the major one in the food field was a failure to maintain a careful, current analysis of requirements, and of country food programs. This contributed in some measure to the difficulties UNRRA had with the CFB. The second most important weakness, and this applied more outside of the conduct of the food and agricultural programs than within, was administrative inefficiency. The staff of UNRRA, including the speaker, was not as large as the responsibilities imposed on it. To this there were many notable exceptions. Too, this weakness of the staff reflected not so much on the Administration as on the member Governments which would not give up

[7] UNRRA Press Release, 15th July, 1947.

on a loan basis enough of their most able workers. However, frequently within UNRRA what looked like mistakes and vascillating and indecisive administration really resulted from such circumstances as (a) too little power being granted the Administration by the Council and its Committee (b) that the Administration was very often without funds to make commitments due to the delays of appropriations by member governments, and (c) the exercise of arbitrary power by national governments and by the Combined Boards.

The Lessons from the UNRRA Experience

What about the contribution of the UNRRA experience to what comes in the post-UNRRA period? First, exports of food from North America have been at an all-time high and will continue large for several years. The role of prices in food exports has been and will continue to be small. Food to be shipped under the Marshall Plan and under other programs will be removed from supply and will be moved almost independently of price. The big question will continue to be to get exporting countries to commit their supplies—there will be relatively little "higgling" over price.

Secondly, we should note that state trading which developed in war-time and continued throughout the UNRRA period, will likely continue to be important for many years to come. Government departments handling supplies, government corporations, or corporations acting on behalf of governments, are the order of the day in Continental Europe, in the United Kingdom, in South American countries, and to a considerable extent in Canada and in the Southern Dominions. This being true, and regardless of our personal views about such undertakings, we must examine closely what is the future of agricultural marketing when such agencies handle farm products. You are aware that the structure ITO implies a good deal of government or state trading. Further, provision is being made in the ITO for commodity agreements. If, as I believe, there will be considerable governmental or state trading and some inter-governmental commodity agreements, then marketing research must be turned towards studies of the implications of bulk purchasing and of the economics of inter-governmental commodity agreements. As a corollary to this question, Professor Viner asks if we can devise the framework for an international

code, applicable to trading between the free-market countries and the state trading countries.[8]

UNRRA was an undertaking developed to be useful in the transition period from war to peace. It is of no little importance that we all understand that UNRRA was terminated before the transition period ended—in fact the end of that period is not yet clearly in sight—and no adequate alternative means of handling the transition problems has been developed. UNRRA shipments in volume ended in December 1946. The Marshall Plan—which is another transition period device—will not get underway in terms of shipments in quantity until the first quarter of 1948. In this intervening period a dribble of UNRRA supplies, some purchased by European countries having a little foreign exchange, those small quantities purchased with U.S. and Canadian credits, and those provided by the military in occupied areas, have moved into consumption. However, there has been left a tremendous gap between food and other transition period relief and rehabilitation needs on the one hand and the supplies shipped against these needs on the other hand. This among other things, has given a setback to world peace.

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[8] Cf. International Finance in the Post-War World, *Lloyds Bank Review*, October 1946, p. 3–17.

FARM OWNERSHIP IN THE UNITED STATES: AN APPRAISAL OF THE PRESENT SITUATION AND EMERGING PROBLEMS

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THE nation is closer today to achieving sound ownership conditions than at any time in the past three-quarters of a century. More farmers than ever before (almost four million) own part or all of the land they operate. There are fewer tenants, less than two million, than at any time since 1890. An all-time record of three-fourths of a billion acres of farm land is now owned by farm operators. Farm mortgage debt dropped to $5.2 billion last year, the lowest point in one-third of a century and less than one-half the amount in 1930. Farmers' equities have climbed to 89 percent of the total value of their farm real estate. Farm foreclosures are seldom reported. Unwilling owners of earlier decades have liquidated practically all of their land holdings. On the surface, at least, the Nation has made real progress towards desired farm ownership objectives.

Closer study of the ownership situation, however, shows that no fundamental changes have occurred which will prevent recurrence of some of the same basic difficulties experienced in earlier decades. Deep-seated weaknesses within our ownership system have been momentarily obliterated by current unexcelled wartime farm prosperity. Public tendencies towards smugness and complacency engendered by prosperity help blind people from seeing or even looking for possible problems on the forward horizon. During a period, such as this, when farm ownership conditions appear to be relatively satisfactory and when the general public is not inclined to search for possible weaknesses, it is both imperative and timely that social scientists undertake a rigorous appraisal of the present situation in light of past experiences and with a look to the future.

Nature and Importance of Farm Ownership

Rights in land and the ownership thereof have always been of fundamental importance to the development of American agricul-

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ture and the welfare of farm people. The nature, transfer, and valuation of these rights constitute the major institutional foundations upon which are built American units of agricultural production—farms, ranches and plantations. Furthermore, farm ownership is a basic ideal to which farm people aspire. It is one which they continually strive to achieve and maintain. Thus, the achievement and maintenance of stable and satisfactory conditions of farm ownership occupy a pre-eminent role in the lives of farm people as well as in the nation's agricultural policies.

Farm ownership has become generally accepted as a cornerstone of American land policies. It is the top rung on the agricultural ladder. Throughout our history farm families have devoted their personal energies, financial resources, and lives if need be, toward climbing this ladder in acquiring farms of their own. Why have Americans placed such a high premium on private property in agricultural land? Why do landless farm families work, save and sacrifice in order to get farms of their own?

The answers to these questions are deeply embedded in the American tradition of individual freedom within limits of social responsibility. Our forefathers who drew the outlines of our land system had been denied both land and freedom in the older countries from which they emigrated. Thus, the founding fathers were determined that farm ownership should be made easily attainable by all Americans. They firmly believed that farm ownership by farmers was indispensable to the independence and dignity of citizens in a free and democratic nation.[1]

These ideas were implemented through important legislation. Soon after the Republic was established, the Ordinance of 1787 forbade feudal land practices in the Northwest Territory. Lands in public ownership were transferred as rapidly as possible to private ownership. Sales were for cash at first. This gave way to credit sales to speed up the process. Sales of land in large tracts were changed to smaller ones more in line with the settler's ability to pay for and improve. The Preemption Act of 1841 gave settlers first chance to buy lands they were developing ahead of the Federal survey. In the 1860's, Homestead Acts gave land to settlers upon condition that they improve and live on the land. The supply of free land

[1] For a more extended discussion of this point, see Marshall Harris, *The Genesis of the Land Tenure System of the United States*, University of Illinois, Urbana, Ill., May 1945.

became exhausted about the turn of the century. The nation then began to reclaim desert and swamp land at public expense for farm families to use and own.

Subsequently credit acts, setting up the Federal Land Banks and later the Farm Security Administration, now the Farmers' Home Administration, were enacted to help remove financial obstacles to farm ownership. Homestead tax exemptions, graduated land taxes on large and absentee holdings and acreage limitations are examples of other measures designed to throw public support behind farm ownership by operators.

Probably the outstanding characteristic of land ownership in the United States is the freedom permitted individual owners to use, sell, mortgage, sub-divide and otherwise convey land. Closely related characteristics are that ownership of land be widely distributed and that ownership by the operator be favored.

Individual ownership interests in land are exclusive; but they are never absolute. Public welfare always stands between the individual owner and absolute control over land. Society is always in a position to exercise its superior authority over privately owned lands in the interests of public welfare; it does this through powers of police, tax and eminent domain. The "spending power" is sometimes added.

Within these broad limits of public control, however, the private owner enjoys exclusive control over his land and possesses wide discretion in its use and disposal. Only two general rules must be heeded: First, control over land is limited largely to the lifetime of the owner. This prevents tying up the ownership of land into future generations as was done in the feudal system. An example of this rule first set forth in the ordinance of 1787 and now included in the land laws of most states is as follows, "The absolute power of alienation shall not be suspended by any limitation or condition whatever for a longer period than during the continuance of a life or lives in being at the creation of an estate and thirty years thereafter. . . . "[2] This rule generally known as the rule against perpetuities "probably approaches mathematical certitude and exactness as closely as any rule that the law has endorsed.[3] Second, land laws of most states stipulate that owners in disposing of property

[2] Wisconsin Statutes as revised in 1942. Chap. 230, Sect. 14.

[3] Brown, R. A. *Cases and Materials on the Law of Real Property*, Callaghan and Company, Chicago, Illinois, 1941, p. 525.

to take effect at death cannot defeat certain rights of widows, widowers, and minors.

All rights in land held by a particular individual at a particular time are known as an estate in land. Thus, an estate is a composite of a definite number of rights of a particular quality.

Various criteria may enter into the classification of estates. For purposes of appraising the ownership situation the characteristics which appear to be most useful are; (1) quantity of rights, (2) permanence of rights and (3) time at which rights take effect. Using these criteria the following classification of estates in land may be constructed. These estates are commonly recognized by most states:

1. Freehold Estate—endures for a greater length of time than a term of years.
   - A. Fee simple estate—is the greatest estate in land people may possess from viewpoints of total rights as well as length of time. It is regarded as enduring forever.
   - B. Fee tail estate—is similar to the fee simple except it can be transferred only to lineal descendents of the owner. Most states do not recognize the fee tail since it is regarded as a remnant of feudalism and inimical to the freedom of the individual and the best use of land.
   - C. Life estate—is similar to the fee simple except it expires at the death of the owner who cannot sell, assign or bequeath anything other than his limited life interests in the land.
2. Non-Freehold (or leasehold) Estates—last only for a certain number of years or lesser periods of time and include estates to be held at the will of the landowner.
   - A. Estate for a term of years—is held by a tenant for a definite period of years. Period of time may be as long as hundreds of years. Farm leases are restricted in some states to a period of 15 years to prevent feudal tenures from arising.
   - B. Estate of tenancy at will—is held at will of landowner who may terminate lease at any time.
3. Estate of Expectancy—consists of rights in land where possession is postponed to a future date.
   - A. Future Estate—takes effect at a particular time, for example, at the death of a life tenant.
   - B. Reversion—comes into being when anything less than a total *bundle* of rights is transferred leaving a reversionary interest for another.

For purposes of this discussion farm ownership is regarded as including the above freehold estates and estates of expectancies but excluding non-freehold estates.

When speaking of a particular farm, however, people generally say it is owned by the operator or it is owned by a landlord. Although people frequently fail to differentiate between farm ownership and owner-operatorship, ownership conditions of tenant as well as owner-operated farms must be included in our concept of farm ownership. The basic ownership interests (freehold estates) remain with the landlord even though certain use and occupancy rights in the form of non-freehold estates are granted to the tenant for a period of time. Thus, tenancy interests and tenancy may be regarded as superstructure built upon the foundation ownership rights remaining with the landlord.

Within the rather broad and seldom used framework of societal powers over private land, the individual owner may use or misuse land to his own personal advantage. He may do this with little regard of the effects upon subsequent owners or future generations.

The pendulum of control over land has swung far to the side of individual freedom. The former sovereignty which kings and lords exercised over lands of our ancestors is gone. It has been replaced by common law plus a few statutes to form "rules of the game" for private ownership of land. There are two major purposes for these rules (including the estates previously outlined): to provide individual owners a more stable basis for bargaining and transfer; and to increase their security of expectations regarding the nature and benefit of particular landed interests.

Public opinion, custom, and law in this country have favored a wide distribution of ownership interests. They have frowned upon concentration of land ownership. At times this meant limitations upon the freedom of individuals to foreclose, purchase, or otherwise acquire exceptionally large bodies of land. More often, however, this characteristic has received implementation through aiding landless people to acquire land. Through a wide distribution of farm ownership, a larger number of individuals have shared in the ownership of land. This was an important attribute, particularly to our ancestors who had been denied land ownership in the older countries.

Farm ownership in the United States is important for both economic and political reasons. From an economic viewpoint farm ownership by farmers has been regarded as society's best guarantee of the development and efficient use of farm land. This was the

main thesis of Arthur Young's observations on farm ownership. It is argued that men are more likely to make lasting improvements and take better care of their own property than if it belonged to the government or other individuals. Under this conception, land becomes a savings bank of present investments for future benefit.

Such ideas were originally formulated by our forefathers. They had been taught to revere land as our richest heritage of the past and the foundation for future generations. But land in the pioneer community was cheap compared with labor and capital. Consequently land was used lavishly, often wastefully as compared with other productive factors. As yet, we as a nation have not recovered from the abundant land philosophy of the pioneer era.

From a political viewpoint, farm ownership has been considered of basic importance to citizens in a democracy. Farm ownership became a guarantee of individual security. It was looked on as a safety valve through which industrial workers could escape to their own land when their personal liberties were threatened. Thomas Jefferson would have made land ownership a prerequisite to voting and holding public office. At the same time he would have made ownership of land accessible to all citizens. As the Nation changed from an agricultural to an industrial economy, our views of the political importance of land ownership also changed. However, many people still regard land-owning Americans as the backbone of our Nation. They think of it as a bulwark against foreign ideologies.

Current Ownership Situation

Extent of Private Land Ownership

Since its birth this nation has been committed to a policy of private ownership of agricultural land. As long as the nation held undeveloped lands suited for agricultural uses, or roughly until the turn of the last century, a major ownership objective was to get public lands into private ownership. Since that time the nation has had the problem of keeping agricultural lands in private ownership. Particular emphasis has been upon owner-operatorship. Practically all of the 1.4 billion acres in farms counted by the 1945 census was in private ownership. Minor exceptions exist in the public grazing lands of the West and in farms owned by public educational and experimental institutions. In contrast, the greater proportion of non-farm land is in public ownership. Of the total

land area of the nation amounting to 1.9 billion acres, one-fourth is in public ownership.[4]

Distribution of Private Ownership Interests

Millions of Americans share in the ownership of the Nation's agricultural land resources. The farm owning group include: the 3.3 million full owners; 661 thousand part owners; around 661 thousand landlord owners of the rented portion of part owner farms; and an estimated 1.9 billion landlords of tenant operated farms. If we assume that the number of people owning more than one farm would about equal the number owning less than one farm, farm ownership units would total around 6.5 million.

Of course the ownership of many farms is shared by several individuals. An example is the case of unsettled estates and undivided interests in land. Then, too, a large number of people probably hold life estates, remainders, and other kinds of ownership interests. Thus, it would seem reasonable to conclude that between 8 and 10 million Americans share ownership interests in the Nation's agricultural lands. This number represents a wide distribution of ownership interests. But in relation to the total population it is small as compared with the proportion of land owners in earlier years.

Ownership of Farms by Operators

Achievement and maintenance of farm ownership by farmers has not been easy. At times the ownership of farms by operators has been severely threatened. Following the American Revolution, Eastern speculators and land grabbers placed serious obstacles in the path of settlers trying to carve farms out of pioneer forest, and prairies. At times early settlers found sufficient cause to take the law into their own hands and "hang land grabbers from trees in good Christian-like manner." Various credit, Pre-emption and Homestead Acts were passed to speed up and make more effective the flow of public lands to private farm operators. These acts were the culmination of American landed ideals at that time. They were expected to solve the problems connected with gaining and keeping farm ownership.

It is not strange, therefore, that the nation was shocked in 1880

[4] For a report on Federal ownership of rural lands, see *Federal Rural Lands*, B.A.E., U.S.D.A., Washington, D. C. June 1947.

when the first agricultural census reporting farm tenure revealed that one farmer out of every four was a tenant. And this happened despite the millions of acres of free lands given to farmers under the Homestead Acts! By 1935, two farmers out of each five were tenants. Over one-half of the nation's land was owned by landlords.

In the wake of World War I farm mortgage debt of owner operators reached ten billion dollars—about one-half the total value of these farms. Farm ownership passed from farmers to absentee owners, particularly corporate owners, at an alarming pace. An equivalent of one farm out of each four was foreclosed between the two World Wars. The agriculture ladder became a treadmill to landlessness and dispair. Its rungs became barriers rather than stepping stones to farm ownership.

Today the situation is much different. Farm incomes are unusually high. Farm owners with mortgages have liquidated part or all of their debts. Many tenents and laborers have become farm owners relatively easily as land values have lagged behind increased farm income resulting from both high prices and high production. All of us have heard of instances where tenants have bought and paid for farms out of two or three years' earnings.

The 1945 census provides the bulk of available information for evaluating ownership conditions. It shows an all-time record number of farm owners. At that time 3,962 thousand farmers owned part or all of the land they operated. The largest previous number was 3,948 thousand in 1910. On the other hand, fewer farmers—1,858 thousand—were tenants than at any time since 1890. The peak number or tenants—2,865 thousand—was reached in 1935.

Since the number of farms has been declining, a look at proportions may be more enlightening. In 1945, a larger proportion of farmers, 67.6 percent, owned part or all of the land they operated. This is the largest proportion of owners since 1890. A low of 57.2 percent was reached in 1935. On the other hand, a smaller proportion of farmers, 31.7 percent, rented all of the land they operated than at any time since 1890. Proportion of farmers who were tenants reached a peak of 42.4 percent in 1935.

The census also reports acreages owned by operators and by landlords. A total of 748 million acres, an all-time record, was owned by farm operators. Of this amount, 192 million were owned by operators who also rented additional land. Landlords owned

only 445 million acres which is the smallest amount in the past half-century.

From the viewpoint of value of land holdings, operators owned $34,926 million worth of farm real estate and landlords' farm real estate was valued at $17,029 million.

Census data for the nation as a whole help create an impression that farm ownership is on a strong and satisfactory basis. Such information helps to justify attempts by the Congress to kill the Farmer's Home Administration and causes State legislatures to terminate laws designed in the 1930's to bolster up a sagging ownership system.

What the Census Fails to Show

Since 1880, when farm ownership first appeared in the United States Census, reports made every 10 years until 1920 and every 5 years thereafter have furnished most of the recurring information on changes in farm ownership. These reports have been widely read. They have been a big factor in influencing thinking on farm ownership. Sometimes these reports have led to erroneous thinking and confused an accurate appraisal of ownership conditions. Several fundamental limitations must be kept clearly in mind when interpreting census changes in farm ownership.

First, the census is conducted on an operating unit basis. Only incidential attention is given to ownership conditions. No ownership information is obtained from landlords; only farm operators are contacted. Consequently, little or nothing is obtained on the amount of land owned, kinds of ownership interests therein, mortgage indebtedness and other important items relating to lands owned by landlords. Much of this information is not obtained from the farm operator either—such important items as the amount of land owned and kind of ownership interests therein.

Second, the census classification of operators leaves the farm labor group out of the picture when discussing ownership conditions. Thus, an increase in proportion of farms owned by operators may mean tenants have dropped down to a lower tenure status of farm laborers; or it may mean tenants have become owners; or it may mean both.

Third, the census is in terms of totals and averages. Thus it may cover up significant changes within particular areas and groups. That is why it is impossible to tell whether particular own-

ers, tenants, and laborers move up or down the agricultural ladder or remain where they were. Also, mortgage indebtedness may show a large decrease for a particular county or state. Yet, an appreciable number of owners may be heavily in debt. A moderate debt on many farms may be supplanted by excessive debt on a few. Yet the total and average debt goes down even though the actual situation for a number of owners deteriorates.

Fourth, owners are all lumped together. Our study of various estates in land shows that there is a tremendous difference in the amount and quality of rights which may be owned. For example, some owners own only a life estate. Others hold fee simple estates. Still others hold only future interests. Yet these various owners may all be counted together. Thus, a farm owner's son who is well along in the process of taking over ownership of the father's farm may be counted as a tenant. Actually, he is probably closer to fee simple ownership than an elderly widow with only a life estate who is counted as an owner.

Fifth, the census definition of a farm (3 acres of land or $250 of farm produce) fails to give a true farm ownership picture. Under this concept an increase in prices qualifies a large number of urban workers who live in the country as farm owners. Here is one of the main causes for the increase of 300,000 "farms" under 10 acres in size since the first World War. The inclusion of these farms into the farm and acreage totals makes difficult an accurate appraisal of farm ownership conditions.

The Bureau of Agricultural Economics undertook nationwide ownership surveys supplental to the 1920 and 1945 census. It wanted to help interpret existing census ownership information and to help supply sorely needed additional data. Results of the 1920 survey were published in two department bulletins and the 1945 ownership data are now being tabulated and analyzed.[5]

In an effort to make census ownership information more useful Black and Allen made an analysis of not only farm operators but all men gainfully employed in agriculture. This study for selected states revealed considerably different ownership conditions than obtainable directly from census reports.[6] A further attempt to

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[5] U.S.D.A. Bulletins 1432 and 1433.

[6] "The Growth of Farm Tenancy in the U. S." *Quarterly Journal of Economics*, May 1937, Vol. LI No. 3, pp. 393–425.

improve the usability of census data was made by the Bureau in connection with the 1940 census.[7]

Farm Labor and Tenancy in Our Ownership System

Farm ownership in the United States has come to be considered as the normal way to operate a farm and to live in a farm community. For similar reasons tenancy and labor have been considered abnormal to American agriculture. Tenancy and labor have been tolerated as temporary steps on the road to ownership to permit prospective owners to accumulate capital and experience. But permanent status as tenants and laborers has been frowned upon. It has been reserved for those individuals lacking ability to manage farms and accumulate savings. Increases in tenants and laborers have been viewed with concern.

Indications of the emergence of permanent tenant and labor groups as an inevitable part of our land tenure system or because of choices of individual laborers and tenants, has likewise been viewed with alarm. Furthermore, many people have tended in an indiscriminate manner to attribute to the institutions of tenancy and labor many of the economic and social ills found in the rural community. Occasionally personal feelings of students and statesmen have biased objective evaluation of the role of farm tenancy in our ownership system.

This general attitude towards tenancy and labor developed while the nation's lands were being settled and made into farms. At that time good land was plentiful; ownership was easily acquired. There was little need for farmers to rent land from others. And farmers remaining as tenants or laborers often were the less efficient. As older communities became settled and land became scarce, rural youth (particularly tenants and laborers not expecting to inherit farms) pushed ahead beyond the ever-present frontier where farm ownership could be readily acquired. Now the last frontier has vanished. Practically all good lands are in private ownership. The result: The relation of tenancy and labor to ownership holds a new and different significance. We are beginning to realize that conditions beyond control of the individual hinder the achievement of farm ownership and make difficult the maintenance of ownership. These conditions include drought, disease, increasing land values, and depression in particular.

[7] "Tenure Status of Farm People." *Land Policy Review*. August, 1941.

Some people by force or by choice now remain tenants and laborers for life. Americans are beginning to realize that our tenure system should recognize this. It should make a place for these tenants and laborers. For example, some thought is being given to the possibilities of extending to farm workers certain social security provisions now provided urban workers.

Further analysis of the farm ownership situation points to some of the conditions causing farm tenancy as well as certain obstacles to farm ownership. Rather than being abnormal and unusual, a certain amount of tenancy under particular conditions appears to be perfectly normal and usual as a basic part of our farm tenure system. A study of the different types of conditions causing farms to be rented indicates that some tenancy is not only inevitable but desirable and basic to the functioning of our tenure process.

As long as people or groups other than farmers acquire and maintain ownership of farms, such farms are destined to be operated by tenant farmers for the period of such ownership. There are many conditions causing farm owners to be landlords. First, farm land may be owned by the County, State, Federal or other public bodies. Since with few exceptions (such as experimental farms and county poor farms) governments seldom operate farms in this country, they must lease the land to tenant operators. Second, similar conditions exist under corporate ownership whether farms are acquired as an investment or to satisfy debts. Third, urban dwellers, particularly those who spent their youth on farms, frequently buy farms for security reasons or as a place to retire later in life. Fourth, farm operators frequently retire to the city or village to live during their remaining years and rent their farms to a tenant. Fifth, frequently farm owners die leaving no heirs interested in operating a farm. In such instances ownership of the farm is transferred to urban heirs who lease the farm to a tenant.

There are also conditions which cause farmers to be tenants. Temporarily, at least, many beginning farmers become tenants as a step towards ownership. Tenancy provides these prospective owners with an opportunity to accumulate both capital and experience necessary to buy and operate a farm of their own. There are also certain economic advantages to tenancy. A beginning farmer with limited capital can generally gain operating control over more land by keeping his limited investment in working rather than fixed capital. He may also reasonably expect to realize a higher rate of

return from his capital as working rather than fixed investments because of the greater risks assumed. During periods of high land prices, such as the present, the beginning farmer and other prospective owners with limited capital may be much further ahead a few years hence by renting for a few years until land prices fall.

Some prospective owners may not have sufficient incentive nor desires to overcome the obstacles to ownership. Poor management and inability to save may prevent others from becoming owners or from maintaining ownership once it is acquired. Broken health, hospital expenses, and death in the family may force other farmers to become tenants by losing ownership or prevent them from acquiring ownership.

Emerging Ownership Problems

This brief review of the farm ownership situation indicates several problematic trends. These trends include: increasing land prices and mortgage indebtedness; short term and inflexible farm purchase arrangements; increasing size of farms; and difficulties inherent in farm transfers from one generation to the next within families.

Increasing Land Prices

Farm real estate prices have almost doubled since the beginning of the war. Farm land prices for the nation have increased 92 percent over the 1935–39 period.[8] Increases in land prices vary widely among different parts of the country. The greatest increase of 172 percent is reported in Kentucky; the smallest increase of 57 percent in is Wisconsin.[9] These increases are quite similar to the rate of increase during the World War I period. However, current increases are from a considerably lower level of land prices which had not recovered from depression influences.

It now appears that land prices have reached the point which may well be considered beyond the long-term productive value of the land. This is the critical relationship between land prices and trouble in farm ownership. Almost three years ago the North Central Regional Land Tenure Research Committee described the land price situation in these words, "There is little in the long-run outlook that justifies land prices as high as those prevailing in

[8] "Land Value Conference," U.S.D.A., Wash. D. C. June, 1947, p. 2.
[9] Ibid., p. 1.

some areas or states during the fall of 1944, except the possibility of further general price inflation or reduction in interest and capitalization rates in the years following the war. Further rises may be justified in some areas, but generally speaking, land prices appear to be beyond the levels likely to be maintained over the next two decades."[10]

Current high land prices present at least three potential dangers for future farm ownership. First, farm land resources become overcapitalized and out of balance with their long-term earning capacity. Second, beginning farmers find it increasingly difficult to accumulate the necessary capital to buy, stock, and pay for a farm. This is particularly true as the lag in land prices overtakes and possibly surpasses advances in farm income. Third, as land prices exceed the long-term earning power of farms, it becomes increasingly hazardous to buy farms on credit with expectations of amortizing loans out of future earnings.

Increasing Mortgage Debt

To the extent that farm purchasers pay for farms out of savings, inflated land prices may not be expected to have serious effects upon future ownership conditions. The real difficulty arises when farm buyers contract by mortgage to pay for land at inflated land prices out of future farm earnings. Such purchasers are gambling on continued high farm income for the duration of their mortgage.

In 1946 farm mortgage debt dropped to around $5 billion. That is the lowest amount since before World War I. It is roughly one-half of the $10.8 billion high following World War I. Within the past year, however, farm mortgage debt has turned upward. For the first quarter of 1947, 42 percent of all voluntary farm sales involved mortgages. Down payments for the mortgaged purchases averaged only 41 percent of the purchase price. Furthermore, one third of the mortgaged purchases (or one-seventh of all sales) during the year 1947 involved indebtedness amounting to three-fourth of the sales price.[11]

On the other hand, about three-fifths of voluntary farm sales, exclusive of purchase contracts, are financed entirely by cash as

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[10] *Preventing Farm Land Price Inflation in the Midwest*, Iowa State Experiment Station Bulletin No. 79. March 1945, p. 429.

[11] *Current Developments in the Farm Real Estate Market*, BAE, U.S.D.A., Washington, D. C. July, 1947, p. 5.

compared with the World War I boom period when cash purchases were as low as one out of five in Kentucky and one out of ten in Iowa. The current mortgage situation is by no means as serious as that prevailing after World War I. But it is headed in that direction. To the extent individual farm purchasers rely on future farm earning to liquidate current inflated prices, potential difficulties lay ahead.

Short Term Farm Purchase Arrangements

The manner in which purchasers of farms on credit contract to retire the debts has critical meaning for future ownership conditions. There is considerable evidence that the period for which many new mortgages are written is far too short to liquidate the loan, judging from past loan experiences. Nearly one-half of the farm loans in the north central states, for example in 1946, were for periods of 5 years or less.[12] There is also some indication that many current credit arrangements do not include flexible payment provisions providing for variable payments in line with yearly earnings. Estimates are that one third of current short term farm loans of five years or less have no provisions for amortization. Many government lending agencies and large banks and insurance companies have adopted newer credit arrangements more in line with farm earning power; they are very conscious of the current land market and are making very few farm loans. But individuals and smaller banks with considerable cash surpluses have re-entered the farm loan market. They are interested in getting their loans repaid before prices go down. So they adopt short-term loan policies and payment plans which may lead to delinquencies and foreclosures if farm income declines significantly before the loans are repaid.

Increasing Size of Farm

During the past 25 years farms have increased 47 acres in size until the present farm averages 195 acres. During this period very small farms of less than 10 acres have increased 100 percent. Large farms of over 1000 acres have nearly doubled. The medium small farms from 10 to 100 acres have decreased 700,000 in number. Family farms of 100 to 260 acres have declined by 287,000.

These changes in farm size in many respects are desirable. They

[12] Unpublished data, BAE, U.S.D.A.

mean more adequate family-sized units in keeping with modern agricultural technological and land use developments. Their effects upon farm ownership, however, are two-fold. To the extent farms become larger and more efficient in operation, ownership should be more easily achieved. On the other hand, certain other factors will tend to make ownership more difficult. As the acreage and total value of farms increase, it becomes increasingly difficult for prospective owners without outside aid to accumulate the necessary capital and equipment to purchase, equip and pay for a farm. This means the prospective owner must postpone buying his farm for many years or buy it partly at least on credit. Under fluctuating farm income conditions it is difficult for mortgaged owners to carry debts over periods of low prices unless farm debt amortization schedules are well adjusted to changing farm income conditions. Then, too, increasing size of farms means fewer farms available for ownership. While average farm size increased 47 acres during the past 25 years, the number of farms decreased by 589,000. The decreasing number of farms tends to make more competition for farms and to drive up land prices.

Difficulties Inherent in Farm Transfers within Families

Contrary to what might be expected, some of the most serious obstacles to farm ownership develop in transferring farms from one generation to the next within families. Some form of family gift or inheritance enters into about one out of each five farm transfers.

The basic problem involved in these within-family farm transfers has three aspects: (1) the average farm family has between three and four children—all potential candidates for the home farm; (2) most farm-owning parents have only one farm which cannot be split up among several children without seriously impairing its efficiency and going-concern value; and (3) a deeply embeded concept of equality, inherent in state laws of descent as well as in the minds of farm parents and their children, distributes the farm either in value or acres among all the children alike. If the farm is split up between the children, the organization and efficiency of operation may be seriously threatened. If one of the children takes over the farm, as owner, he has to buy out the others. During periods of high land prices like the present, the child remaining on the farm may be forced to go hopelessly in debt in order to buy out the other's shares.

Chronic Weaknesses in Farm Ownership

In addition to these emerging ownership problems which are rather easily detected from existing information, there exist several fundamental weaknesses of a more subtle nature which continually plague farm ownership in this country. These weaknesses include: (1) exclusive freedom of the individual owner to use and transfer of land without enforceable responsibility to preserve the land as an essential factor of production; (2) unsuitability of ownership system to ups and downs of business cycle; (3) secular and cyclical fluctuations in land values; and (4) tendency to capitalize all benefits accruing to the farm into land values.

Rights without Responsibilities

Probably the most serious weakness of farm ownership from a public viewpoint, at least, is the complete freedom with which individual owners may buy and sell or otherwise transfer land as they would ordinary chattels and use up the productivity of the land as they would a piece of machinery or any other replaceable goods. As mentioned earlier, this freedom of use of land was largely a reaction against feudal and public land controls under which our ancestors had lived in the older countries and to a certain extent in this country during the colonial era. The absence of responsibilities encumbent upon land owners as stewards of the Nation's lands was not noticeable during the 18th and 19th centuries when land was plentiful and of little value. As older lands wore out, newer and richer lands could always be found beyond the advancing frontier. However, as all of the Nation's lands became occupied, national attention became sharply focused upon the preservation of our land resources. For a time attention was concentrated on increasing the supply of new lands through drainage and irrigation.

Conservation programs involving the expenditures of billions of dollars have been attempting to correct some of the damages resulting from misuse of land. So far, however, the Nation has hardly begun to get at the basic causes of land deterioration in making individual owners accept basic responsibilities as stewards of the land for future generations. Unless some adjustments are made in farm ownership for the care of land, it does little good to spend billions of dollars of public funds in bringing new land into production or in reclaiming old land.

Ownership Unsuited to Unstable Income

Implicit in our ownership system is the assumption that farms can be paid for by each generation out of farm earnings and that mortgages can be amortized from fairly uniform annual farm income. However, the depressions following World War I furnish abundant proof that the down-swing of the business cycle is one of the most pernicious factors obstructing the achievement and maintainance of farm ownership by farm operators. The droughts, dust storms, insect plagues, and other natural hazards experienced during the middle thirties also obstructed farm ownership by reducing the farmers' ability to pay off debts and accumulate savings. Both depression and natural hazards are beyond the control of the individual. They demand public action to cushion the shock. Any success in ironing out deep fluctuations in the business cycle will increase stability to farm ownership. However, it appears far more fruitful to make some adjustments in farm ownership to fit changing income conditions resulting from either price or production changes or both.

During the past decade when the business cycle has been on the upswing coupled with record breaking farm production, farm ownership has come easily. But experience reminds us that lower prices and production are entirely possible if not probable in the years ahead. In a setting of considerably lower prices or production or both, how well would farm ownership be maintained? What would be the record of the farm ownership program during a period of decreasing farm income? Needless to day, the record would be considerably different than obtained during the past decade of rising farm income. It appears reasonable to conclude that farm ownership remains unsuited to wide fluctuations in farm income, particularly the downswing of economic cycles.

Fluctuations in Land Values

Closely related to changes in farm income are changes in land values. Since this country was settled, there has been a general and persistent trend towards higher land values. As the supply of free land became exhausted, population increases through immigration and natural increase had a particularly stimulating effect upon land values.

Others factors also tend to increase land values. For example, some farmers prize ownership so highly that they are willing to

put income which might well be attributed to their own labor and managment into the value of land. In some instances landownership is achieved only through sacrifices of the health and education of the farm family. In bidding against each other for farm ownership, prospective and current owners may push values up beyond the long-term earning power of the land. This competition is stiffened by urban residents who use non-farm income to purchase farms. All of these factors together bring about increases in land values. They make it difficult for young farmers to accumulate the necessary down payment or to pay for the farm out of farm earnings.

At present, land prices are rapidly becoming tied to abnormally high levels of farm production and prices. Current mortgages for these high land prices contract the purchaser to amortize the loan out of farm earnings similar to those now realized. Suppose current land prices prove to be about double the long-term productive value of land; then all purchasers paying down only 25 percent of the purchase price are actually going into debt for 150 percent of the normal value of the land. Hence, their equity becomes a negative 50 percent. Since many of these purchase arrangements are for periods of 5 years or less and stipulate fixed annual charges, the situation points to a repetition of some of the same pitfalls experienced in earlier decades.

Benefit Capitalization into Land Values

Another basic weakness within farm ownership is the tendency to capitalize all benefits accruing to the farm and farm family into the value of the land. This problem becomes very concrete in connection with tobacco allotments. The same tendency exists in the case of homestead tax exemption laws. In both instances the purpose of the law of aiding the current operator is negated as soon as the aid becomes capitalized into land values. Of greater importance is the more subtle tendency of getting the benefits from labor of the farm family capitalized into land values. To the degree that owners must draw on the labors of their family and deprive them of food, health and education to pay for the farm, the value of the farm is derived from sources other than its productivity.

What Can Be Done Now?

In our appraisal of the farm ownership situation it appears

reasonable to conclude that emerging problems and chronic weaknesses may well forecast serious difficulties ahead in farm ownership. In reviewing these problems several tasks invite our immediate attention and serve as challenges to all students of land problems.

More Accurate and Timely Information

The need for more complete and current ownership information is apparent. Since the census is taken on a farm operating unit basis, little attention has been given to ownership conditions not limited to a particular operating unit. The farm owner, when a landlord, is not contacted and the tenant seldom is able to provide reliable ownership information. Consequently, outside of widely scattered spot studies and two sample surveys made by B.A.E. supplemental to the 1920 and 1945 Censuses, little is known about who owns our farms, how they are owned, how farms are acquired and transferred, extent of concentration of ownership and other urgently needed ownership information. In recognition of this need for better ownership information, representatives of the Regional Land Tenure Research Committees, State Experiment Stations, Bureau of the Census and Bureau of Agricultural Economics came together in a meeting sponsored by the Farm Foundation to develop a program for improving the collection, analysis and presentation of current data on farm ownership.[13] Specific recommendations growing out of this meeting are proposed for inclusion in the 1950 Census of Agriculture and the B.A.E. enumerative surveys.

Research on Fundamental Problems

More accurate and timely ownership information alone is not sufficient. Basic research is needed to interpret this information properly, to facilitate a better understanding of ownership problems and to suggest alternative methods for coping with these problems. For example, in effecting responsibilities of farm ownership commensurate with existing ownership rights of individual owners, research should delve into the advantages and disadvantages of public ownership of agricultural land. Private ownership of agricultural lands has been taken for granted. Yet in recent years

[13] Recommendations contained in report of Tenure Statistics meeting, Chicago, Ill. Feb. 1947. Sponsored by Farm Foundation.

the Nation has tended towards public ownership of forest and recreational lands. Large acreages of grazing lands are also publicly owned.

Obviously public ownership avoids many problems associated with land inflation, foreclosures, farm transfers, and the frequent necessity of paying for farms each generation. But what about the disadvantages? As public controls over private lands increase in the public interest, private ownership resembles public ownership more and more. In this connection would it be better to start with public ownership and make adjustments for the best interests of private use and occupancy of land? Or is it better to start with private ownership of an exclusive character and effect public qualifications and controls over private land in the public interest? Actually we are following the latter course. But have we properly analyzed this course in terms of the public ownership alternative?

Another area of ownership research concerns the role of farm tenancy and landlordism in a desirable system of farm ownership. Farm tenancy for the Nation as a whole has now declined to the one-third proportion recommended as normal and desirable by Spillman, Hibbard, and other early students of the agricultural ladder. The question may be raised why have any tenancy, particularly if 100 percent loans are workable? In other words, what are the advantages and disadvantages of substituting "lendlords" for landlords? If a significant proportion of farm continues to be tenant operated, what is the function of the landlord? In earlier years the landlord furnished both credit and management to young farmers. With the large number of urban farm owners and women landlords resulting from the operation of the laws of descent, has not the function of landlords changed materially?

The problems of tranferring farms as going concerns and of paying for farms each generation has elicited considerable interest but has received little research attention.

Difficulties experienced in estate settlements and transferring farms within families should continue to receive attention of research men.

Another important ownership area of inquiry is concerned with getting ownership conditions ready for possible declines and wide fluctuations in farm income. Some of this research should be concerned with preventing excessive mortgage debts and unsatisfactory

purchase arrangements. But an increasing amount of attention should be devoted to remedial measures to be undertaken if and when serious income fluctuations threaten the stability of farm ownership.

The extent to which all farm and family benefits are capitalized into land values should be studied. We should also study means to prevent those types of capitalization which negate ownership improvement measures. An example is homestead exemption taxes.

The role and limitations of government in stabilizing ownership conditions should receive careful study. It would appear that government has a real responsibility in removing or lessening effects of obstacles to ownership beyond individual control such as depression and natural hazards. However, the question arises as to the extent government should subsidize private ownership and the extent government should go into real estate credit.

Education, Legislation and Credit

Much has already been done by the colleges, Extension Services, Department of Agriculture, Bankers' organizations and other groups to educate farm people and all prospective owners on the dangers of land booms and heavy mortgage debts incurred in purchasing inflated lands. Careful appraisal of farm land on a long-term yield and price basis should continue to be encouraged. Land appraisal clinics which have proved so successful in Illinois and other states should be extended. Educational measures might well be enlarged to include desirable kinds of credit and farm purchase arrangements which have been tried and proven to be well adapted to farm credit conditions. Special attention might be given to current problems in estate settlements under conditions of high land prices.

Now is the time to study and effect legislation to stabilize ownership conditions. Let's not wait until serious difficulties develop and the pressure of an emergency situation demand that speed characterize remedial action. Attention should be given to the problem of debt moratoria, debt adjustment, corporate holdings and large holdings. If such legislation were considered and passed during a period of relatively satisfactory ownership conditions like the present, two major advantages would result. First, more sober and judicious action could be taken without the heat,

impetuousness, and pressures accompanying emergency situations. Second, people would possess greater knowledge of the "rules of the game" and could plan accordingly.

Probably the greatest service rendered by public credit agencies like the Farm Credit Administration and the Farmers' Home Administration should not be counted by the numbers of farmers they have aided in achieving and maintaining ownership. The 45,000 farmers helped to ownership by the FHA is rather insignificant when viewed in terms of total farm ownership changes. However, both of these agencies have succeeded in demonstrating the effectiveness of better farm purchase and credit arrangements. These include long term loans, variable payments, low interest, supervised credit, and appraisals on long term earning power of the land. Through demonstration buttressed by a certain amount of competition, larger farm credit sources have now adopted these same principles to the advantage of all agriculture.

In looking to the future, it might be well to measure the contributions of these public agencies in terms of similar contributions, rather than in volume of loans. Such services are worth many times the costs of the agencies. It is well that the public credit agencies have now largely withdrawn from farm credit activity. However, they should stand ready to expand when land values again get below the long-term earning power and other credit sources dry up. Also, these agencies should continue to develop and try out new credit arrangements better adapted to farm ownership needs.

THE ROLE OF ECONOMETRIC MODELS IN ECONOMIC RESEARCH*,[1]

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IT IS the object of this paper to set forth some of the interrelationships between econometric models and research in economics. More specifically, we shall discuss the part played by econometric models in determining the statistical techniques employed by the research worker. Yet another way of saying the same thing is that we shall examine what happens when we "wed" (or don't wed!) economic theory and statistical methods. As we shall show, the union is a productive one.

I. *Simultaneous Equations in Economic Theory*

1. When the economist wishes to explain the determination of price in a market he has recourse to perhaps the most familiar of all economic "laws": the law of supply and demand. In its simplest and most elementary form the explanation runs somewhat as follows. (1) The behavior of (potential) purchasers of the commodity in question may be represented by a "demand curve," which shows the quantity which people are willing to purchase at each possible price. (2) The behavior of (potential) suppliers of the commodity may be represented by a "supply curve," which shows the quantity which people are willing to sell at each possible price. (3) The price which tends to be established is that which brings to equality the quantity demanded and the quantity supplied.

This same explanation may be stated in the form of equations. Statement (1) may be written as

$$x^d = D(p) \tag{1}$$

* A paper presented at the annual meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 10, 1947. It will be reprinted in Cowles Commission Papers, New Series, No. 27.

[1] I wish to acknowledge my indebtedness to Trygve Haavelmo, both for the help which I have received from his published work and for the personal assistance rendered by him in the past. Those who are familiar with his work will immediately recognize that many points in this paper are taken directly from it.

I am indebted, also, to the following members of the Department of Economics at the University of Chicago, and of the Cowles Commission for Research in Economics, for critical reading and many helpful suggestions: Kenneth J. Arrow, Evsey D. Domar, D. Gale Johnson, Tjalling Koopmans, Jacob Marschak, and Don Patinkin.

where x^d represents the quantity demanded, and p represents the price. Statement (2) may be written as

$$x^s = S(p) \tag{2}$$

where x^s represents the quantity supplied. Finally, we may write for statement (3)

$$x^d = x^s. \tag{3}$$

This is a system of simultaneous equations which determines the unknowns x^d, x^s, and p.

Stated in this way there is no danger that we shall become involved in a controversy over whether "price determines quantity" or "quantity determines price." The truth is that there is mutual determination of quantity and price.

As we progress from this static, partial-equilibrium analysis to more sophisticated explanations and models, the same fundamental truth holds: many of the variables in which we are interested must be regarded as being determined by a whole system of interacting economic forces. We shall refer to such variables as "jointly dependent," or "endogenous." To regard them as independent would simply be to contradict our economic hypothesis.

2. Suppose that we wish to explain the determination of the national income.[2] A simple hypothesis might be that: (4) Consumption expenditures may be expressed as a function of national income. (5) Investment expenditures are determined outside the economic system, so that while investment may influence economic activity it is not capable of being affected by the economic system. (Variables of this type are called "exogenous." So far as the economic system is concerned they are "independent" of the functioning of the economic system.) (6) Finally, we have the statement that consumption expenditures plus investment expenditures constitute the national income (by the definition of "investment.") We then have, expressing the "model" symbolically,

$$C = f(Y) \tag{4}$$

$$I = \text{an exogenous variable} \tag{5}$$

$$Y \equiv C + I \tag{6}$$

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[2] We may assume here, for simplicity of exposition, that there are no taxes or government expenditures.

where C = consumption expenditures
I = investment expenditures
Y = national income.

Equation (5) is, of course, "trivial," and may be dropped; but the net effect is that we have now classified our variables: I is exogenous or "independent," while C and Y are endogenous or jointly dependent. Therefore C and Y may each be expressed as functions of the variable I, and, given the function f, both C and Y may be said to be determined by I. Here, then, is the problem of the econometrician; to measure the parameters or coefficients of the function f.

No econometrician or statistician, however, would seriously uphold the hypothesis represented by equation (4), as it now stands, because we know it to be unrealistic. Clearly there are many things other than income which determine the decisions of individuals as to how much they will spend on consumption—habits, education, weather and many, many other factors. Furthermore, even assuming that all of these other factors are known and can be measured, it is extremely doubtful whether we may postulate the existence of an exact consumption function.[3] Such an assumption is equivalent to saying that individuals always react in exactly the same (known) fashion under similar (known) sets of circumstances.

Thus because our knowledge is necessarily imperfect, and perhaps also because we believe that human beings do not always react like automata, we are compelled to admit that our consumption function as expressed in equation (4), is incorrect. Instead we should have to write

$$C = f(Y) + u \tag{7}$$

where u represents the joint effect of all of the omitted factors.

Let us see whether we can say anything more about u. Clearly if we have reason to believe that there is some second systematic factor S_1 (say) which influences the consumption decisions of individuals, and which is capable of quantification, there is no point in including it in the "catch-all" u term. Rather we should prefer to write

$$C = f_1(Y, S_1) + u_1. \tag{7.1}$$

[3] We abstract here from errors of measurement in the data.

If we proceed in this manner until we have exhausted all of our *a priori* information, we might find that there would be (say) n such factors included in the function f, so that we obtain

$$C = f_2(Y, S_1, S_2, \cdots, S_{n-1}). \tag{7.2}$$

Suppose that we now perform an experiment of the following kind: choose a set of values of the variables $Y, S_1, \cdots, S_{n-1}$, and confront consumers with this *same* set of values in a number of trials, each time recording their consumption decisions. We should find that, in general, we do not obtain exactly the same value of C in any two trials; that is to say, we would not succeed in "explaining" completely the observed values of C. Hence, we should have to write, instead of (7.2)

$$C = f_2(Y, S_1, S_2, \cdots, S_{n-1}) + u_2 \tag{7.3}$$

where u_2 represents the joint effect of whatever has been omitted from our "explanation."

An analogy may be helpful. Consider a simple experiment in which we repeatedly throw twelve perfect dice, and let us define a random variable

$$z_1 = 100z_2 + z_3 \tag{8}$$

where z_2 is an arbitrarily selected integer, remaining fixed in repeated throws of the twelve dice; and where z_3 is the sum of the points appearing simultaneously on the face of the dice.

Let us carry out a number of trials in which z_2 is given the value 10(say). z_3 may take on any value from 12 to 72. We might find that, in repeated trials, we obtain the following values for z_1:

1040, 1069, 1025, 1030, 1054, 1048, etc.

Now the expected value of z_1 (in the mathematical sense of expectation) is clearly 1042 when z_2 is given the value 10, but on any one trial there may be (in general, will be) a deviation from the expected value, due to the operation of "chance" in the throwing of the dice: we have not introduced explicitly all of the factors affecting z_1. Hence even though we repeat the "same" procedure in each of a number of trials, we ought not to expect z_1 to take on exactly the same values.[4]

[4] Some readers may find it helpful if we write, instead of (8)

$$z_1 = 100z_2 + 42 + v \tag{8*}$$

where v is the deviation from the expected value of z_1 due to "chance."

Similar considerations apply to economic phenomena. For example, the value of C which we obtain from equation (7.2) by substituting the appropriate values of the arguments is, in general, different from that obtained by actual observation: there is a "random element" u_2, as shown in equation (7.3). It follows immediately that the variables C and Y must themselves be random variables, the joint distribution of which is given once we specify the distribution of u.

What has just been said about the necessity for the inclusion of the random variable u in the consumption function applies equally to many other equations of economic theory. For example, all of the equations describing human behavior, such as demand and supply functions, must be regarded as being subject to random elements which are termed "shocks"; these shocks representing the joint effect of all of the factors not explicitly introduced. Similar considerations apply to the technological relations of economic theory. It is, perhaps, a fair generalization to say that only definitional relations are free from such shocks. It should be emphasized—though we shall have more to say of this later—that the u's of our economic relations are not observable variables; hence an integral part of any economic model is the specification of the probability distribution of those disturbances.

3. Before going on to discuss some of the consequences of this "probability approach," it may be worth while to suggest briefly why we are interested in the estimation of parameters of the economic system. Apart from considerations of intrinsic scientific interest, perhaps the main reason for desiring such knowledge is that many questions, especially of policy, cannot be answered without it. Suppose, for example, we should find that there is a very high correlation between the price of a commodity in period #1 and the output of that commodity in period #2. No doubt this relationship will suffice to predict output, provided that nothing has happened to alter the underlying economic situation. But what if we wish to discover the effect on output of (say) a tax on one of the ingredients? Clearly the relationship in question will not help answer our question: we require knowledge of the economic structure. (By the term "economic structure" we mean the parameters of the whole system of equations).

The usefulness of such knowledge for prediction or policy purposes of course depends on whether there is, in fact, some degree of permanence in the structure itself. It is difficut to imagine what

purpose could be attached to the calculation of the marginal propensity to consume (say) from historical data, if we know that its value is unstable. In any event, we shall assume here that there are parts of the structure at least which are relatively permanent: the whole concept of "structure" seems to imply this. In a more profound view it may be true that the distinction between the "relative permanence" of the structure and the "temporary" values assumed by exogenous variables is merely a matter of degree. But perhaps that is all we require for practical purposes.

It should not be assumed that a change in structure due, perhaps, to a policy change, necessarily invalidates the results of our research from historical data. Some types of change in structure may take place which it is possible to forecast with a fair degree of accuracy and certainty, and which allow us to modify the structure *a priori*; with others, our knowledge may be less useful. We shall assume, in any case, that the immediate object of economic research *is* measurement of parameters.

In the the next section, then, we shall discuss the consequences for our estimation procedure of the facts that (1) there is mutual determination of many economic variables, and (2) there are random elements or shocks in many of our economic relations.

II. *The Single-equation and Simultaneous-equation Approaches*[5]

4. When we consider the fact that a whole system of equations is required to describe how economic variables are determined, it can easily be demonstrated that there are logical inconsistencies, in many cases, in applying the single-equation, least squares method to the estimation of the parameters. Perhaps the simplest illustration of some of these inconsistencies can be obtained by considering a very simple system with only a demand equation and a supply equation. Let the demand for the commodity in question be written as

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[5] For a more complete discussion of some of the points discussed here, see:
(1) Trygve Haavelmo, "The Probability Approach in Econometrics," *Econometrica*, Vol. 12, Supplement, July 1944.
(2) M. A. Girschick and Trygve Haavelmo, "Statistical Analysis of the Demand for Food: Examples of Simultaneous Estimation of Structural Equations," *Econometrica*, Vol. 15, No. 2, April 1947.
(3) Trygve Haavelmo, "The Statistical Implications of a System of Simultaneous Equations," *Econometrica*, Vol. 11, No. 1, January 1943.
(4) Tjalling Koopmans, "Statistical Estimation of Simultaneous Economic Relations," *Cowles Commission Papers*, New Series No. 11.

$$x_t = \alpha p_t + \beta + u_t \tag{9}$$

where $x_t \equiv$ the quantity demanded at time t
$p_t \equiv$ the price at time t
$u_t \equiv$ the joint effect at time t of all omitted factors

and the parameters are α and β. Similarly the supply function may be written as

$$x_t = \gamma_1 p_t + \delta_1 + v_t \tag{10}$$

where, again, v_t represents the joint effect at time t of other variables not explicitly stated.

We shall assume that u_t and v_t are random drawings from a stable probability distribution and that they are independent in successive observations. This assumption is one which is employed also in the case of the single-equation least-squares approach.

In the latter approach we would consider only one equation at a time, ignoring the other. Suppose then, that in equation (9)—the demand equation—we should regard x_t as the dependent variable. We are then saying, in effect, that p_t would have been assigned the same set of values if the sample had been repeated.[6] It would, therefore, be impossible to choose p_t as the dependent variable in the supply equation, for, being the dependent variable it would have to fluctuate from sample to sample—which contradicts the assumption made for equation (9). Suppose, then, that we should choose the same variable as dependent in each equation (x_t let us say). Then according to the demand equation, x_t would reflect the disturbance in the demand relation viz., u_t, due to the infinity of (small) factors affecting the decisions of purchasers, while according to the supply equation, x_t would reflect the random elements in the decisions of sellers, v_t. This can occur only if, in repeated samples, there is perfect correlation between u_t and v_t, since the shocks enter linearly. Now, while there may be legitimate economic or other grounds for believing that there is some degree of correlation between them, there cannot be perfect correlation except in the case where all of the additional independent factors affecting demanders are also those which affect suppliers. In general we may say that whenever a new equation is added to a system the sampling model ought to be such as to add a new and independent source of disturbance.

[6] See the dice-throwing example in Section 2.

5. Suppose that we wish to estimate the parameters α and β of equation (9) by a least squares regression of x on p, where it is known that the u's are normally and independently distributed with

$$E(u_t) = 0 \quad \text{and} \quad E(u_t^2) = \sigma_u^2 \tag{11}$$

for all values of t. We wish to show that the result of this procedure will depend on the form of the supply function.

Consider first the supply equation (10). We shall assume that v_t is normally and independently distributed with

$$E(v_t) = 0 \quad \text{and} \quad E(v_t^2) = \sigma_v^2 \tag{12}$$

for all values of t. Further, let

$$E(u_t v_t) = \sigma_{uv} \tag{13}$$

be the covariance between u_t and u_t, while m_{xp} and m_{xx} etc. denote second order moments about the means. The means of the variables we shall denote by m_x and m_p respectively. The regression of x on p gives the regression equation

$$x(\text{est.}) = ap + b \tag{14}$$

where

$$a = \frac{m_{xp}}{m_{pp}} . \tag{15}$$

In order to eliminate complications arising from sampling variations, let us consider what formula (15), for estimating α, would mean with an infinite sample. Solving simultaneously the original (demand and supply) equations of our system, (9) and (10), we get

$$x_t = \frac{\alpha\delta_1 - \beta\gamma_1}{\alpha - \gamma_1} + \frac{\alpha v_t - \gamma_1 u_t}{\alpha - \gamma_1} \tag{16}$$

$$p_t = \frac{\delta_1 - \beta}{\alpha - \gamma_1} + \frac{v_t - u_t}{\alpha - \gamma_1} . \tag{17}$$

With an infiinte sample we can replace m_{xp} and m_{pp} by the covariance σ_{xp} and the variance σ_{pp} respectively. From (16) and (17) we get

$$\sigma_{xp} = \frac{\alpha\sigma_v^2 - (\alpha + \gamma_1)\sigma_{uv} + \gamma_1\sigma_u^2}{(\alpha - \gamma_1)^2} \tag{18}$$

$$\sigma_{pp} = \frac{\sigma_v^2 - 2\sigma_{uv} + \sigma_u^2}{(\alpha - \gamma_1)^2} . \tag{19}$$

Substituting these expressions in equation (15) we obtain a value for a which approaches, in the probability sense, the limit

$$t^a \to \infty \to \frac{\alpha\sigma_v^2 - (\alpha + \gamma_1)\sigma_{uv} + \gamma_1\sigma_u^2}{\sigma_v^2 - 2\sigma_{uv} + \sigma_u^2} . \tag{20}$$

It is apparent that the value of this expression will not, in general, equal α, since it depends also on the σ's and on γ_1 . Thus the estimate obtained by the single-equation method is not a consistent estimate of α.

In fact, if equation (10) is the true supply function it is impossible to estimate α (or β) by any method whatsoever. This may be shown quite simply: let us multiply (9) by λ, and (10) by $(1-\lambda)$. Adding, we get

$$x_t = [\gamma_1 + \lambda(\alpha - \gamma_1)]p_t + [\delta_1 + \lambda(\beta - \delta_1)] + \lambda u_t + (1-\lambda)v_t. \tag{21}$$

This equation is of the same form as either of the original equations and the residual term has exactly the same general properties as u or v (which are not, in any case, observable.) Thus by varying λ we can get an infinite number of equations, any one of which can replace (9) or (10) without any observable effect on the x's or the p's. There is, in fact, no way of identifying the particular equation (9). So if (10) is the true supply equation there exists no formula for estimating the parameters of the demand function. The important thing to note is that this cannot be seen unless we also specify the supply function: the demand function alone tells us nothing.

This may be further illustrated diagrammatically, as follows. In figure 1 let price be represented on the vertical axis, and quantity on the horizontal axis; and let the points shown represent the series of observed price-quantity combinations. We wish to estimate the parameters of the demand and supply functions when the true model consists of equations (9) and (10).

Consider now the price-quantity combination represented by point 1, which is reproduced in figure 2. Clearly there are an infinite number of demand and supply equations which could have produced the observed point; and similarly for each of the other observations. Hence, unless we have some *a priori* information about the variances σ_u^2 and σ_v^2 of the shifts in the demand and supply curves,

there is obviously no method of estimating the parameters of equations (9) and (10).

Suppose, however, that the true supply function is

$$x_t = \gamma_2 p_{t-1} + \delta_2 + w_t. \tag{22}$$

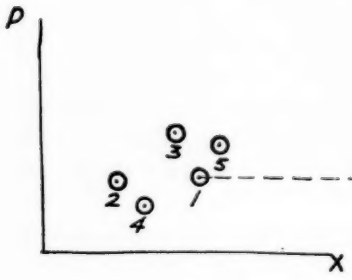

FIG. 1

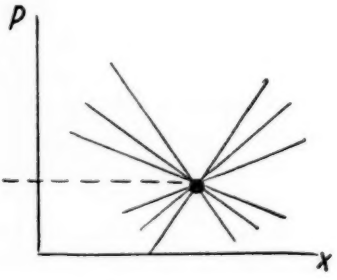

FIG. 2.

Our model then consists of the demand equation (9) and the supply equation (23). Solving simultaneously we get

$$p_t = \frac{\gamma_2}{\alpha} p_{t-1} + \frac{\delta_2 - \beta}{\alpha} + \frac{w_t - u_t}{\alpha} \tag{23}$$

$$x_t = \gamma_2 p_{t-1} + \delta_2 + w_t. \tag{24}$$

Since p_{t-1} does not depend on u_t we may legitimately apply the method of least squares[7] to the estimation of the parameters γ_2, δ_2, γ_2/α, $\delta_2-\beta/\alpha$. With a sufficiently large sample we can get these estimates as accurately as we please; and from these four estimates we can in turn calculate the corresponding estimates of α and β. But note once more: we could not have deduced this method of getting α and β by specifying the demand function alone.

Let us see what a would be when (22) is the true supply function, again assuming an infinite sample. From (23) and (24) we obtain

$$\sigma_{xp} = \frac{\gamma_2^2}{\alpha} m_{pt-1,pt-1} + \frac{1}{\alpha}(\sigma_w^2 - \sigma_{uw}) \tag{25}$$

$$\sigma_{pp} = \frac{\gamma_2^2}{\alpha^2} m_{pt-1,pt-1} + \frac{1}{\alpha^2}(\sigma_w^2 - 2\sigma_{uw} + \sigma_u^2) \tag{26}$$

[7] On the small sample bias of this method see L. Hurwicz "Least-squares Bias in Time Series," to appear as article XV in the forthcoming Cowles Commission Monograph No. 10.

$$(27) \qquad a = \frac{\sigma_{xp}}{\sigma_{pp}} = \frac{\alpha(\gamma_2{}^2 m_{pt_{-1},pt_{-1}} - \sigma_{uw} + \sigma_w{}^2)}{\gamma_2{}^2 m_{pt_{-1},pt_{-1}} + \sigma_u{}^2 - 2\sigma_{uw} + \sigma_w{}^2}.$$

As shown by equation (27), a is not, in general, equal to α. Nor is it equal to (20).

The conclusion from all of this is, I think, obvious. It is impossible to derive statistically the demand function, from market data, without specifying the supply function. More generally, in order to estimate the parameters of any particular economic relationship on the basis of market data, we are compelled to consider simultaneously the whole system of economic relationships which together represent the mechanism that produces the observed data. The assumptions of our statistical procedure must not contradict our economic theory.

Let us sum up what we have just said. Our object was to estimate the parameters of the demand function. We abstracted from fluctuations due to sampling by dealing with an infinite sample. We then considered the consequences for our estimation procedure of two alternative supply functions, and we saw that different estimates of α, in the demand function, were obtained with each supply function. Hence we concluded that the whole system of equations must be taken into account in deciding what our statistical procedure ought to be.

We saw, further, that there may be cases in which it is impossible, by any method whatsoever, to estimate the desired parameters. We shall refer to this problem, at a later stage, under the heading of "identification."

III. *A Technique for Practical Econometrics*

6. Until recently, econometric work which made use of time series data appears to have been of two general types.

The first type dealt with some particular functional relationship of economic theory in which the investigator was interested; e.g., a demand curve or a production function. Some one variable was then chosen as the dependent variable—though the basis of the selection was not always clear—and the regression of that variable on the remaining variables calculated. Recognition of the fact that the variables chosen as independent frequently were not "really" so, led some investigators to consider each of the variables in turn as dependent. Whether or not this practice was followed a funda-

mental difficulty remained: how were the results to be interpreted? What was their relationship to the parameters of economic theory?

One example of the correct application of the statistical procedure just described is provided by the supply equation (22), in which output is a function of price in the previous period (p_{t-1}) and of a random variable (w_t). Since the disturbance w_t is assumed to be non-auto-correlated, and uncorrelated with the price in the previous year, at least squares regression of output on p_{t-1} may be permissible. The fact that there are such cases, however, does not invalidate the conclusion reached in the previous section: where variables are in fact mutually determined and "disturbances" are present, the whole system of equations must be considered in determining the statistical procedure.

The second type of work which has been done in the past was of a somewhat different character. Instead of attempting to estimate the parameters of the relations of economic theory, the investigator would take a regression of one variable on other (presumably "independent") variables with which he suspected there was some connection, the object being, perhaps to predict the dependent variable. Again, the procedure was sometimes valid (see, for example, section 3), though it was often difficult to see what determined the choice of variables: indeed, there were times when it seemed as if the only possible criterion were the size of the correlation coefficient. But, in general, it is not possible to judge its validity without specification of the entire model, without some "assurance" that the "independent" variables are not considered dependent in some other part of the model. What is the general framework within which we must work in order not to involve ourselves in logical inconsistency?

7. Suppose that we wish to determine the marginal propensity to consume, from time series data. How shall we proceed? First, let us write the equation in which we are immediately interested: our theory is, let us say, that we may represent the behavior of consumers by a "consumption function," for which we write

$$C_t = f(Y_t) + u_t. \tag{28}$$

What we desire to estimate is $f(Y_t)$. Now we know from economic theory that both consumption and income are determined within the system; that is to say, although consumption depends upon income, income is itself partly a result of consumption: they are

mutually determined. Another way of saying much the same thing is that u_t is correlated both with C_t and with Y_t. Thus we are compelled to write the whole system of equations which influence C_t and Y_t.

What else do we know about the formation of C_t and Y_t? Suppose we have a theory that there exists an "investment equation," analogous to the consumption function, such that we may write investment as a function of income and taxes.

$$I_t = g(Y_t - T_t) + v_t. \tag{29}$$

Suppose, further, that incomes may be augmented by government expenditures (E_t) or diminished by government taxation (T_t); both of which we believe to be exogenous. We may then write

$$Y_t = C_t + I_t + E_t - T_t. \tag{30}$$

Let us assume that u_t and v_t are non-auto-correlated so that

$$E(u_t u_{t-\theta}) = 0, \qquad E(v_t v_{t-\theta}) = 0 \tag{31}$$

and, further, that

$$E(u_t v_{t-\theta}) = 0, \quad \text{for} \quad \theta \neq 0. \tag{32}$$

Now, in order to keep the illustration simple, let us assume that this exhausts our *a priori* economic information. To carry out the required estimation, it is necessary to re-write the consumption and investment functions more explicitly:[8] we assume here that they are linear. We then obtain, from equations (28) and (29) respectively,

$$C_t = \alpha_1 Y_t + \alpha_0 + u_t \tag{28.1}$$

$$I_t = \beta_1(Y_t - T_t) + \beta_2 + v_t. \tag{29.1}$$

We are then required to estimate the parameter α_1.

From the system consisting of equations (28.1), (29.1) and (30), we may write

$$Y_t = \frac{1}{1 - \alpha_1 - \beta_1} E_t - \frac{1 - \beta_1}{1 + \alpha_1 - \beta_1} T_t + \frac{\alpha_0 - \beta_1}{1 - \alpha_1 - \beta_1} + \frac{1}{1 - \alpha_1 - \beta_1}(u_t + v_t). \tag{33}$$

[8] At the present stage of statistical theory it seems to be necessary to specify the form of the function *a priori*.

Because of the assumptions of (31) and (32), and because of the fact that E and T are exogenous, we may apply the method of least squares to the estimation of the coefficients

$$\left(\frac{1}{1-\alpha_1-\beta_1}\right) \text{ and } \left(\frac{1-\beta_1}{1-\alpha_1-\beta_1}\right)$$

of equation (33), in order to obtain consistent estimates. Let these estimates be r_1 and r_2, respectively. We then have

$$r_1 = \frac{1}{1-a_1-b_1} \tag{34}$$

$$r_2 = \frac{1-b_1}{1-a_1-b_1} \tag{35}$$

where a_1 and b_1 are estimates of α_1 and β_1, respectively. Since the estimates r_1 and r_2 are known, equations (34) and (35) are sufficient to determine a_1 and b_1.

Let us see what we have done so far. First the problem was defined. Second we set up a model specifying all of our *a priori* information on the problem at hand, including the distribution of the u's. Third, we adopted a statistical procedure for the estimation of the parameters which would not contradict our assumptions. This third step involved: (a) expressing the endogenous variables in terms of the exogenous variables; (b) estimating the coefficients of the resulting equations; and (c) obtaining estimates of the original parameters from the coefficients estimated under (b).

8. We may now take up a point which, so far, has been deliberately omitted: this is the problem of "identification."

In the immediately preceding discussion, equation (33) gives Y_t as a function of E_t, T_t and the random elements, and this was derived from the model consisting of equations (28.1), (29.1) and (30). Now it follows at once from the same model that we may also write C_t and I_t respectively, as functions of E_t, T_t and the random elements. Each of these functions will yield, after the application of least squares, two equations of the form of (34) and (35) involving a_1 and b_1; so that there are a total of four independent equations[9] to

[9] There are six such equations, only four of which are independent, however.

determine the two unknowns a_1 and b_1. In general (in finite samples) the estimates of a_1 which we obtain will vary with the particular equations used (of the four just mentioned). This is known as "over-identification."

With other models, however, we may be confronted with situations in which equations are either just identified or not identified at all. An example of bare identification is provided by the model consisting of equations (9) and (22), discussed in section 5; while an example of lack of identification is given by equations (9) and (10).

As we saw previously, it was impossible to estimate the parameters of equations (9) and (10)—when that was the model—by any method whatsoever; so that "absence of identification" means "impossibility of estimation." But what are we to say about over-identification versus bare identification?

It can be shown that where bare identification exists, the method described in sestion 7 will give maximum likelihood estimates of the parameters; whereas with over-identification all that can be said for the method is that the estimates are consistent.[10]

IV. *The Role of the Model*

9. By virtue of the foregoing discussion, we may now proceed to a more explicit statement of what the role of the model ought to be in econometric research.

(a) The first important function of the model is that it constitutes a well-defined statement of our economic hypothesis or hypotheses. Another approach to the same point is that the model enables us to state, and to employ, all of our *a priori* information on the problem at hand.

(b) The use of an econometric model renders explicit the assumptions on the basis of which the investigation proceeds.

(c) Thirdly, the model itself, when fully formulated, serves to determine the statistical technique which ought to be employed (in the light of what we seek to accomplish), so that (1) there are no inherent contradictions in our procedure, and (2) our estimates have certain desirable properties.

(d) Once our estimates have been obtained, the model enables us

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[10] Even with over-identification it is possible to obtain maximum likelihood estimates, but this problem is beyond the scope of the paper.

to interpret them without difficulty, provided that our statistical technique has been properly chosen.

(e) Finally, the use of a model makes it possible—in cases where it is possible at all—to orient our research so as to answer specific questions of policy.

THE USE OF ECONOMETRIC MODELS IN THE STUDY OF AGRICULTURAL POLICY*

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DESPITE the degree of attention social scientists have given to public policy issues, there has been all too little emphasis given to systematic formulations of methods of study of policy problems. We have many books and articles dealing with specialized research methods and techniques, yet there are few such works on the peculiar aspects of problems presented by research in the field of policy.[1]

It is standard procedure for research workers and students to expect certain formal and substantive verifications of the results and conclusions of research work, as well as a reasonably complete description of the methods and techniques used in securing the results. Presumably any research project should be so conducted that another scholar could conduct the same experiment or study and obtain the same results, problems of error and chance aside.

The same procedure is all too frequently not applied in studies of and pronouncements on public policy. Consequently, the attitude is quite prevalent that anything a social scientist says about policy is a personal opinion, bearing little or no relation to science or scientific procedure. This situation is most unfortunate and stems largely, I believe, from the failure of scholars on one of two scores—either students fail to follow any systematic method of approach in studying policy or they do not give to their readers or listeners all of the data pertinent to their conclusions.

If social scientists are to have a substantial impact upon the way society organizes its affairs, study of policy must be conducted in

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[1] Approaches to the study of policy that I have found to be useful include the following:

Talcott Parsons, *Structure of Social Action* (New York: McGraw-Hill Bools Co. 1937) esp. chaps, 1, 2, 3 and 19.

Gunnar Myrdal, *The American Dilemma* (New York: Harper Bros., 1945) esp. Chap. 1 and app. 1 and 2.

J. D. Black, ed., *Research in Agricultural Policy*, Social Science Research Council, Bulletin No. 21, June 1933.

John Neville Keynes, *Scope and Method of Political Economy* (London, Macmillon and Co. Ltd., 1904) 3rd ed. chaps. 1, 2, 3, 4.

A. C. Pigou, *The Economics of Welfare* (London, Macmillan and Co., Ltd., 1946), 4th. ed. esp. Part I.

such a way that the results will be accepted as scientific rather than personal. The present low level of general esteem of work in social science, at least in political circles, may be due in part to the apparent inconsistencies in the policy positions of social scientists on any public issue. Most of the inconsistencies are due to differences in certain assumptions, usually unstated, that are basic to the conclusions. If such assumptions were openly stated, it would be evident, logical errors aside, that the inconsistencies were not due to a basic flaw in the structure and method of the social sciences.[2]

In considering the use of econometric models in the study of agricultural policy, it seems necessary to indicate first of all a method of approach to the study of policy issues. Only when this is done, does it become possible to evaluate the usefulness as well as the limitations of econometric models in policy studies.

I. *An Approach to the Study of Policy*

Public policy involves more than economic behavior; policy should be considered within the whole framework of social, political, and economic behavior. This presents the economist interested in public policy with a basic dilemma—either he must restrict his analysis to abstract economic behavior and thus surround his policy studies with a cloak of unreality or he must attempt to synthesize the whole of the related human behavior within the framework of his study. The first horn of the dilemma seems, to me, to be highly unsatisfactory. It involves the fallacy of misplaced concreteness and places the economist in an untenable intellectual position. Economic behavior is not the sum total of human behavior. This problem plagues the farm management expert; it is even more important when political considerations enter.

The second horn leaves the economist uneasy because most of us consider ourselves incompetent to weigh and judge the impact and significance of social and political forces upon the selection and operations of particular policies. Yet I think the student of public policy has no alternative but to strike out and face the issues that

[2] Economists should not always blame politicians for bad economic policy. Much of the fault is with the economists themselves in many instances. Where economists fail to agree, public officials choose their policies by the company they keep, so to speak. It would be a serious situation if there were perfect agreement among all economists on all issues, yet it should be an accepted responsibility of all economists concerned with public issues to make their assumptions sufficiently clear and explicit that the non-economist can discover why one economist comes to a different conclusion from another.

are involved. The economist, if he advocates a particular price, production, income, or foreign trade policy, makes certain implicit assumptions about values, norms, ends, goals, political processes, and administrative flexibility. At a minimum, the economist should make explicit the assumptions made with respect to significant non-economic influences at work. At the maximum, the economist should become a student of those aspects of sociology and political science which would permit him to become a student of political economy in its broadest sense.

The issue of conflicts of interest brings to a head the difficulties evident in the study of policy. It is, of course, possible to take a completely dispassionate and presumably scientific view and point out the effects of a particular policy upon various affected groups. This would leave to others the task of deciding whether the gains to certain groups are more important than the losses to others. A preferable procedure, in my opinion, is to attempt to weigh the gains and losses and come to a positive conclusion with respect to a particular policy.

Given the problems noted above, the means-end schema represents the most appropriate analytical framework within which policy issues may be analyzed. The means-end schema provides a setting which insures consideration of the significant elements involved in studying policy issues.

Stated briefly, the means-end schema involves five basic elements—(1) the actor; (2) uncontrollable conditions of action; (3) controllable conditions of action which we shall call means; (4) ends or objectives; and (5) the normative orientation of action. In the case of public policy, the actor may be conceived of as the legislative and executive branches of the government. The conditions of action that are uncontrollable include weather, floods, reactions of foreign governments to a policy, discovery, and changes in relative costs in another country.

The means, when applied to public policy, relate to the changing of social and political institutions as well as to actual rearrangements and use of resources in the usual economic implications of the term. For example, in the first instance, the means involved in the establishment of a TVA should be viewed as the creation of a new institution and an appropriate legal framework. Only after this means has been established does the actual utilization of economic resources to create certain physical facilities (dams,

power plants, bridges, power lines) to perform specific functions and to carry on specific activities (sale of power, education, control of floods, production of fertilizer) becomes possible and meaningful. Thus the means must be seen as a continuum—with one set of means serving to create another and so on until ultimate ends are reached.

The end or ends of policy relate to a future state of affairs which is assumed to be desirable—to be preferable to existing circumstances.[3] In analyzing policy the economist must give attention not only to the end or ends to be achieved by a specific policy, but also to the significance and priority of these ends compared with other ends in the general hierarchy accepted in society. The ends of public policies are really intermediate ends—ends that are not sought for themselves but are instrumental with reference to other and more nearly ultimate ends. Consequently, the ends of most public policies should be considered as means to still other ends. In other words, we are dealing with an intermediate sector of the means-end schema.

The normative conditions of action are extremely important in arriving at policy conclusions that have validity in a particular society. A norm can perhaps be defined as a situation or course of action that is considered an end in itself.

Norms are selective standards whereby the end is related to means and uncontrollable conditions. One such norm that economists almost always put forth, usually without realizing its significance as a normative condition and value judgment, is that efficiency or economy is an accepted value or criterion of action. People should economize in the use of resources. Economics as a positive science indicates that, errors and minor aberrations aside, people do attempt to economize.[4] But in studies of policy we start with the basic assumption that people *should* economize in the use of resources, and that, individually and collectively, people want to economize.

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[3] The maintenance of the status quo—its protection from trends or forces operating in the society—may also be an explicit goal.

[4] The term positive science is used to denote that part of economics specializing in the description of the world as it is. Positive is thus differentiated from normative which implies a study of what ought to be, and of economics as an art which is the study of ways and means of attaining ends. Positive science deals with uniformities and generalizations, while a normative science is concerned with the determination of ideals or goals. Economics as an art is concerned with deriving rules or guides to action that will aid the acting group in attaining the desired ends. Cf. John Neville Keynes *The Scope and Method of Political Economy*, pp. 34–35 and 46–56.

But means cannot be selected solely in terms of their efficiency in achieving ends—in the economic context of the word efficiency. No matter how small the application of resources required to achieve a given increase in national income, the citizens of the United States would be likely to reject such a policy if it required a significant surrender of freedom and individual liberties. Other less crucial normative elements are frequently evident in the selection of means. A normative element frequently ascribed to farm people is that income should be earned in the market place. If this norm is actually held—and income can be earned only through operations in the market place—certain means of increasing farm income during a depresssion are ruled out at once.[5]

As economists, and perhaps the disability is not limited to us, we probably understand less about the capacities and characteristics of the acting agent than any other part of the study of the policy. The legislative bodies and administrative agencies play a mixed and tangled role in the determination and modification of policies. Each administrative agency creates its own vested interests and attracts to it other interests. Political action does not take place in a vacuum, to use a trite phrase. Bureaucracies are run by men, are responsive and responsible to other men. Some bureaucracies are flexible and virile; others are tough, hard, and hidebound; still others are interested largely in power and bigness. Some are perhaps accidents—the result of a strong personality. In no case is it easy to visualize how well a particular policy can be administered, nor how the policy will be changed and modified by experience and expediency.

Our previous discussion indicates that the study of policy carries the economist beyond the traditional confines of positive economics. The economist becomes concerned with ends. He must decide what ends are important and how the ends and satisfactions of different groups may be weighted. The economist must take a stand with respect to the normative elements or valuations of appropriate methods and techniques of accomplishing the accepted ends. In the

[5] A major argument against compensatory price or income payments programs is that explicit subsidies are involved, and the income thus received is not earned. What is involved here, however, is largely a matter of ignorance. Farm people need to be informed that an increase in income received through a surplus disposal operation is no more earned or unearned than a similar increase in income received through subsidies. The fault lies, in part with agricultural economists, since we have failed to give farmers the information necessary to make a rational decision.

study of policy it must be remembered that conflicts of interest arise both with respect to ends and the means used to achieve the ends.

How can we apply the means-end schema to the analysis of policy? A simple application involves the division of the study of policy into three fairly distinct facets. These three facets embrace all of the elements of the means-end schema plus placing emphasis upon the function of analysis in making the appropriate choice among alternative means.

The first facet is the statement of the formal conditions of an optimum. This first of all involves selection and weighing of ends. But ends are popularly expressed in verbal terms not directly amenable to analysis. Such ends as maximization of satisfaction or income must be spelled out in terms of specific conditions which are necessary for the achievement of the end or the optimum conditions in terms of an analytical framework. For example, in farm management it may be assumed that the end of the entrepreneur is maximum profits. The statement of the optimum is necessary to indicate when this end is achieved. Among the conditions for the optimum are the proportionality of factor prices to the marginal physical products of the factors and the proportionality of the marginal costs of the outputs to the prices of the outputs. In addition, if a long run view is taken, the marginal opportunity cost of the entrepreneur—his alternative income in another occupation—must be no greater than his income as a farmer. These conditions are concepts that can be verified within the framework of economic analysis.

The second part of the study goes beyond the simplest interpretation of the means-end schema. This part involves determining (a) if there is a significant difference between actual circumstances and the optimum condition, and (b) the reasons, causes, or factors responsible for any divergencies between actual conditions and the optimum. This second step is required in appraising either current or proposed policies. The relevance to choice among alternative policies of the factors associated with a disequilibrium should be evident immediately. If, for example, in a study of policies designed to improve incomes in agriculture, it is found that half of the farmers have low incomes because the resources they own are inadequate in amount, price increasing measures may be ruled out as a means of attaining the desired end.

The third and final facet is the actual formulation of policies and institutions capable of approximating the formal conditions of the optimum. It is at this point that the means-end schema is probably an important safeguard against errors and omissions. Operating within the framework of the schema implies recognizing the nature and characteristics of the actor and the impact of normative elements upon the choice of means. In addition the choice of means involves prediction—the estimation of the effects of various means in a particular setting.

Research in the social sciences can be divided into theoretical and practical (policy) research. In theoretical studies the economist is concerned with the discovery of facts and causal relationships among facts, the development of hypotheses and generalizations. In practical or policy studies, the economist relates goals or ends and normative considerations to factual situations and derives therefrom plans of action or programs.

The practical or policy studies must rest firmly upon the theoretical studies. It is equally true, though perhaps less obvious, that the theoretical studies are closely related to practical problems and issues. In the social sciences, theoretical research must have an explicit or implicit tie to policy research. There are millions of "facts" and millions of causal relations among facts. Hypotheses by the gross may be tested, many generalizations may be put forth. Thus the facts which are investigated and the causal relation, hypotheses or generalizations studied are studied because the researcher considers them important.[6] The only definition of importance seems to be in terms of the usefulness of such studies to society in solving its problems or in understanding its nature.

The important point to be made here, however, is that basically theoretical and policy research are similar. Both rest upon the selection of assumptions according to significant criteria. Both require correct logic in going from the assumptions to the conclusions implicit in the assumptions. The implication is that the value judgments or normative conditions and ends that are introduced into the study of policy are really no different from the assumptions about human behavior that are introduced into the theory of the firm or the theory of choice.

[6] There are, I would presume, a few studies in the social sciences that are made wholly from idle curiosity, without any consideration being given to the significance of any discovery either to the analytical frameworks of science or to policy or practical issues. But such research must constitute a minute fraction of the total.

II. *Role of Econometric Models*[7]

Econometric models and their statistical representation of the real world serve three functions in the study of policy:

(a) Econometric models and the underlying economic theory indicate significant interrelationships among economic variables in the real world. Such knowledge is necessary in understanding the way the economy actually functions. In this context econometric models add to our theoretical insights about the economy.
(b) Econometric models are of assistance in determining or verifying the reasons why a particular situation differs from the optimum.
(c) Econometric models indicate the probable effects of alternative means or programs. This is the essentially predictive role of econometric models, and as such models are developed, may represent their most significant contribution to the study of policy.

We may indicate at this point what econometric models do not contribute to the study of policy:

(a) Econometric models do not help in the choice of ends or statement of optimum conditions.
(b) Econometric models do not aid in evaluating the special characteristics of the acting agent.
(c) Econometric models do not reflect the influence of normative conditions in determining the choice among alternative means.

It is thus apparent that econometric models have a limited, yet extremely important, role to play in the analysis of policy. It is important that the econometrician recognize that more than a statistical system is required for advocating policies of any sort. It is equally important that those of us who are not econometricians recognize that statistical tools are now available that give promise of providing us with relatively accurate knowledge where we usually rely upon intuitive insights and common sense observation. Econometric models should represent a more nearly "scientific" approach, since the results should be reasonably independent of the personal whims of the particular worker. Insofar as the models attempt to describe the actual world or to serve as the basis of forecasts, all workers should be able to arrive at the same conclusions.

If econometric models are to make a maximum contribution to the study of policy, it is clearly necessary that much thought precede the construction and statistical fitting of the model. The policy

[7] The use of the term *econometric model* is restricted to those econometric models providing consistent estimates of the parameters. See above, Gersohn Cooper.

questions must come before a model is constructed rather than afterwards. The necessity for this approach is readily understandable. There are literally hundreds of different models that could be used to describe the interrelations between agriculture and the rest of the economy. Some might emphasize the flow of grains, of livestock, of machinery, or the rate of investment. Others might show the movement of labor, the long term growth of marketing services or changes in relative prices. As an aid in answering certain questions some models may be wholly useless, perhaps misleading.

The construction and fitting of econometric models is a time-consuming and expensive task. Consequently much preliminary work is required to decide what questions—policy questions—are important, are subject to uncertainty, and for which answers may be expected from empirical investigation.

A simple model may be used to illustrate the comments made above. Two questions have very frequently been at the forefront in agricultural policy in recent years. One question has related to the effect of changes in the supply of farm products upon prices and incomes. Another has been concerned with effects of variations in the level of investment and national income upon farm income. It was essentially to answer these two questions that the first of the multiple equation models that applied specifically to agriculture was developed.

The first model included only three equations—a demand equation for food, an income generating equation, and an income definition equation. The resulting model was:[8]

$$x_1 = 0.05 - 0.06 + .24$$
$$y = 3.0Z + 0.7$$
$$y = P_1x_1 + P_2x_2 + Z$$

where

x_1 = annual per capita consumption of food
x_2 = annual per capita consumption of non-food
P_1 = deflated price of food
P_2 = deflated price of non-food
Y = annual per capita deflated disposable income
Z = annual per capita deflated investment expenditures.

[8] This model is due to Trygve Haavelmo, who has contributed perhaps more than any one else to the development of the multiple equation approach in economic statistics. See his article, this JOURNAL, Vol. XXIX, pp. 910–924.

This econometric model assumes that the supply of food is exogenous—that there is no supply function for food but that annual changes in food supply are due to such factors as weather, diseases, and insects.

This model indicates the significance of changes in investment—and thus income—upon farm people and their welfare. A ten percent increase in investment will increase farm income by 3.6 percent, if food supply remains constant. The income of non-food producers will increase by only 1.7 percent. This model explains what we have all observed for so many years—the extreme variability of farm income as investment changes. Two extremes—1932 and 1947—are within the memories of most of us.

The model also gives strong apparent justification to the early New Deal policies of production control—if one considers the interests of farmers paramount. Demand is sufficiently inelastic that a 10 percent decrease in the supply of food would increase prices by 50 percent and gross income of food producers by 40 percent. At the same time, assuming investment constant, real incomes of non-food producers would fall by about 13 percent. Though production control, if successful, would have increased farm income, it would not have increased the size of the national income.

The model noted above is not capable of answering many policy questions. For example, it will not indicate the probable effects of a food stamp plan upon farm prices. Certain additional data are necessary. Nor will the model indicate the effect of a withdrawal of labor upon farm income. There is no production function to indicate the relationship between labor and the supply of farm products.

A second application of econometric models to agricultural policy is being made in an attempt to answer a question given high priority by many of us: Why have farm incomes been low traditionally?

Many have accepted the hypothesis that such low incomes are due to an excess supply of labor in agriculture. In obtaining insight into the effects and causes of low incomes certain subsidiary propositions need to be investigated, of which the following are the most important:

(1) What are the marginal productivities of resources employed in agriculture?
(2) What factors influence the movement of labor between agriculture and the rest of the economy?

(3) What would be the equilibrium rates of return to labor under alternative assumptions with respect to income and employment in the economy?
(4) What would be the effect upon incomes in agriculture of a migration policy designed to reduce the supply of agricultural labor and entrepreneurship?

This model involves nine equations, including demand equations, production functions, income generating equation, and labor supply functions. It is thus a much more complex model than that described above.

III. *Policy and Economics Structure*

Economists have always been confronted with the task of forecasting or predicting the effect of policy changes upon significant economic variables. The difficulty of this task has depended to a considerable extent upon a characteristic of each policy—whether or not the policy represented a change in the basic economic relationships or structure of the economy. Where the demand and supply equations, production functions, etc., remained unchanged by a policy, it is relatively easy to indicate the impact of such a policy upon the economy. Such policies may be said to change only exogenous variables. If government spending is considered as an exogenous variable, it is a relatively simple matter to trace through the effects of changes in government spending upon income, employment, output, and prices.

The economist has always been in difficulty in forecasting the effects of policies that change basic relationships existing in the economy. This implies that historical relationships and patterns no longer hold in a direct and explicit fashion. Faced with this situation, economists traditionally have tried to construct new relationships that would more nearly reflect the changed conditions. When one works with econometric models, exactly the same procedure is required.

In general, it may be said that there are three types of basic relationships that describe the economic structure of an economy. These structural relationships describe: (a) human behavior, such as consumers' demand; (b) technological conditions, such as production functions, and (c) institutional arrangements, such as tax systems and debt policies. An econometric model delineates the economic structure as it has existed in some past historical period. A policy that changes structure implies that a new set of structural

relationships are required to describe the future. Consequently, the econometric model cannot be used to determine directly the effect of the policy.

The task of the economist working with econometric models, as is the case with those not using explicit models, is to determine how the policy changes economic structure. The economist will first of all have to determine what parameters or coefficients in the system are likely to be affected. He will then have to decide, on whatever grounds are available—experimental data, *a priori* grounds, introspection—what values the parameters are likely to take.[9] Using the approximate values of the parameters in the econometric models, it is possible to indicate the expected values of the significant endogenous variables. In this way a rough estimate—affected as it is by the intuitive judgments concerning changes in economic structure—of the effects of a policy that changes economic structure may be made.

In which group do most agricultural policies fall? I suspect that most of them fall in the second group—policies that change economic structure. Such would be the case with the following policies and programs: forward prices, food allotment programs, production control, price support devices such as commodity loans and price discrimination, and soil conservation. A price payments program that did not increase price certainly would probably not affect structure. Since American exports are probably large or small due to exogenous influences, an export subsidy program would leave structure unchanged. Similarly, a sales tax or higher tariffs would not affect the basic economic structure.

In the field of general national policies that have so much significance to agriculture—monetary-fiscal policies—many programs do not affect structure and the economic effects of such policies can be forecast without too much difficulty. Such measures as government deficits, varying the money supply, changing tax rates and paying subsidies of certain types may be treated as exogenous and as not affecting economic structure.

We have not as yet noted the relative merit of econometric models that provide estimates of structural relationships compared with models derived by least squares estimates of single equations,

[9] In no real case as it likely that the changes in parameters will be known with (approximately) complete certainty. However, the sign of the change and the approximate magnitude of the change may be all that is required to choose among alternative policies.

derived one at a time. The relationships represented in a structural system have a basic characteristic not attributable to relationships derived by the customary regression techniques. This characteristic may be called autonomy.

The autonomy of the relationships or equations in a structural system is due to the fact that each equation represents (approximately) a single behavior, technological or institutional relationship. Consequently a particular relationship is not affected by whatever changes may be made in another equation, unless such a change directly affects the parameters of two or more equations.[10]

As Prof. E. J. Working pointed out 20 years ago, the characteristic of autonomy can not be attributed to the demand and supply equations derived from market data by the customary least squares approach. Such equations represent a hybrid between demand and supply, probably representing the intersection points of shifting demand and supply schedules.

Such equations, if basic conditions in the economy do not change, are useful for predictive purposes. However, the ordinary least squares equations are likely to be very misleading if one desires to forecast the effect of a particular policy which changes basic economic conditions. To illustrate, a so-called demand curve derived from time series data by least squares is not an adequate tool for estimating the effect of a production control program upon farm prices. The "demand" curve most likely, though not in every case, represents a hybrid curve reflecting both demand and supply conditions. Now that supply conditions have changed the hybrid curve is essentially useless for the particular prediction desired.

It is the autonomy of the structural relationship—and all relationships in theoretical models have such autonomy—that makes it possible to use econometric models to indicate the effect of policies even when structure has changed. By exposing each relationship,

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[10] These points may be illustrated by an example. Let us say that we have a model that includes only a supply and a demand equation for food. The supply equation is shifted to the right due to technological change. If this shift in the supply function does not alter the distribution of income or if the food consumption function is linear, there is no reason why the demand functions of the conventional type will not remain unchanged. However, if the distribution of income is changed and the food consumption function is not linear, then the demand equation will be changed. In part this will be due to the fact that the demand equation is not a true structural equation. If demand depends upon the distribution of income, a variable reflecting the effect of changes in the distribution should be explicitly introduced into the function.

the nature of structural changes may be indicated and the effects of the policy predicted.

IV. *Conclusions*

Econometric models have only recently been explicitly introduced into agricultural economics research. Such models may well represent a considerable step forward, providing us with new and more exact knowledge of the basic economic characteristics of agriculture and its relations with the rest of the economy.

New and improved knowledge of the economic structure will help greatly in formulating the most appropriate policies. But econometric models do not offer a four-lane highway down which we may travel to find answers to all of our policy questions. In the case of any policy certain judgments with respect to ends and optimum conditions, normative elements, and institutional limitations must be made. In the case of policies that result in a break in structure, qualitative judgments not statistically verifiable are required.

THE USE OF ECONOMETRIC MODELS IN AGRICULTURAL MICRO-ECONOMIC STUDIES*

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I INTEND to discuss in this paper certain developments in econometric technique within the general frame of reference provided by micro-economic studies, that is, studies of firms or industries.

The quantitative study of economic relations involves: (1) a statement of these relations in a quantifiable form, perhaps in the form of an equation or a set of equations in variables which have some empirical reference; and, (2) in the absence of experimental procedures, a statistical process of fitting which will assign numerical values to the parameters of the equations. The term "quantifiable," however, must be given a more precise meaning. Not only must the variables in the equations be measurable, but some provision must also be made in the equations for the inevitable presence of residuals. Without such a provision and some further specification of the residual or disturbance term, the process of fitting is not likely to be rational or appropriate, except by some happy accident. The statement of economic relations in a quantifiable form, with the indicated connotation of the term "quantifiable," I shall call an econometric model.

I

The discussion of econometric methodology is easily focused on two issues: (a) the role of economic theory in econometric inquiry; and, (b) the treatment to be accorded to disturbances or residuals. The attitudes of econometricians toward economic theory may range widely, from one extreme of adopting a wholly dependent position by defining the task of econometrics as mere passive quantification of the abstract schemes provided by the economic theorist, to the opposite extreme of completely disregarding existing economic theory. The disturbance may be viewed as: (a) attaching itself to one variable of the set of variables considered by the investigator—the aggregative effect on the selected variable of

* A paper presented at the annual meeting of the American Farm Economics Association, Green Lake, Wisconsin, September 8–11, 1947.

a host of minor variables not individually considered in the analysis; (b) being present in each variable or most variables in the set—errors of measurement; (c) a combination of (a) and (b); (d) attaching itself to the equations of the model with which the econometrician is operating, but generated by the neglect of many minor influences; (e) a combination of (b) and (d).

What should be the role of economic theory? It is evident that when we attempt to measure economic relations some sort of theory about such relations is automatically brought to bear on the problem. How else, it may be asked, would the investigator know how to begin attacking the problem? The issue is clearly, not: first measurement then theory, versus first theory then measurement. It is rather, measurement, with or without *existing* economic theory.

With respect to the treatment of disturbances, it should be observed that the decision to attach the disturbance to this or that variable does not by itself provide sufficient basis for a rational choice of statistical method. Something else must be said about disturbances. Restrictions on the disturbances may be imposed within the set of observations with which we are working, i.e., on our sample. For example, we may assume that the disturbances are mutually uncorrelated, that they are uncorrelated with the "true" values of the variables, etc. Or, we may define the disturbances as stochastic variables whose probability distributions are characterized thus and so, and bring to bear on our problem the powerful methods of modern statistical inference. If we choose the first alternative, we obviously shall not be able to attach probability statements to our estimates; if we choose the second, we shall indeed be in a position to make probability statements, but apparently very few people will take them seriously. In point of fact, however, the first procedure is considerably more restrictive, and far less plausible than the second.

In the 1920's and the 1930's, practically all of the quantitative studies in agricultural economics (or for that matter in economics generally) which had as their objective the analysis of economic relations used in one guise or another the classical regression methods. That is to say, one variable was selected more or less arbitrarily by the investigator from the relevant set of variables to play the part of the "dependent" variable, and was expressed as a function, usually linear in its parameters, of the other variables in

the set. The parameters of this function were then estimated so as to minimize the sum of squares of the residuals in the dependent variable. Rather widespread dissatisfaction was felt with this procedure as an analytical (as opposed to forecasting) technique. The relevant theory was stated in functional terms and hence treated all variables symmetrically. Yet here was a statistical method in which one was forced to choose sides, and in which different estimates were secured of the same parameters, depending on which variable was chosen to play the dependent part. The econometrician's predicament was described in somewhat humorous terms by Henry Schultz as follows:

"If, however, we are asked to determine the effect of a change in conditions of supply—say, the imposition of a tariff—on prices, imports, and consumption, we need to know, among other things, the elasticity of demand of the commodity in question. And we cannot conveniently say to the legislator, 'Your tariff will have one effect if the elasticity of demand is computed from the regression of price on quantity, and quite a different effect if it is derived from the regression of quantity on price'."[1]

The solution accepted by Schultz was based in turn on his treatment of what lately has been termed the problem of "identification." Because in his demand studies Schultz dealt with agricultural staples, he made the plausible assumption that for each commodity considered, the demand schedule was stable, i.e., the random shift element was negligible, while the supply schedule was subject to violent random shifts. The presence of residuals was thereby attributed to errors of measurement. Schultz' procedure of comparing estimates of elasticities of demand based on regression of quantity on price, of price on quantity, and on trend-ratio and link-relative transformations of variables, in order "to determine the degree of confidence which we are justified in placing in our statistical findings," was not a formally correct procedure consistent with his own formulation of the problem, and Schultz was, of course, aware of this fact. It was a conscious misapplication of classical regression methods because the more appropriate methods were more laborious and because their proper application called for information generally not available; namely, knowledge of the relative magnitudes of the error variances for each variable in the set.

The technical problems which arise when the disturbance is

[1] H. Schultz. *Theory and measurement of demand.* Chicago, 1938, p. 148.

treated as errors of measurement (problems of weighted regression) were considered rather fully in a pre-World War II study by Koopmans.[2] Since then, much the same approach was adopted by Tintner. In a study recently published[3] Tintner begins with a complete static Walrasian system which is reduced to manageable proportions by the introduction of aggregative theoretical variables. The original complete system is thus transformed into another system with a smaller number of variables, and differing from the original system by some disturbance. Before measurement can begin, observed variables must replace the theoretical aggregative variables, thus introducing errors of measurement. Tintner assumes that the disturbances introduced by the transition from the complete to the aggregative system (and by other causes) are negligible, and disregards them in his treatment which is then based wholly on the presence of errors of measurement in the observations. The required error variances for each variable are estimated by means of the variate difference method. We are not concerned here with the technical problems which arise in this approach, and the efficiency of the methods used to solve them in this particular study, but rather with the position taken with respect to the general issues. The reduction of all disturbances to errors of measurement does not appear to be a realistic explanation of the presence of residuals. With any theory, however complex, the feeling remains that the reality for which the theory attempts to account is even more complex, and that many influences are of necessity neglected in the theory.

A model of the workings of economic machinery can, of course, be built up which is logically consistent with the classical least squares procedures, to be used as an analytical rather than a forecasting technique. As an example, we may take an ordinary price analysis. The argument can be developed about as follows: From observation of the behavior of buyers in the market it may be inferred that the price of the given commodity, e.g., the price the buyers are willing to pay is affected largely by variables A, B, and C, and, in addition, by a multitude of other variables too numerous to list, let alone, to measure. The direction of causation is clearly fixed in the model and observations over time of price and of

[2] T. Koopmans. *Linear regression analysis of economic time series.* Haarlem, 1937.
[3] G. Tintner. "Multiple regression for systems of equations." *Econometrica*, January, 1946.

variables A, B, and C are available. The influence of residual variables is impounded in a disturbance the presence of which transforms price into a stochastic variable. We shall disregard errors of measurement.

The foregoing leads us directly to writing the mathematical expectation of price as a function (for simplicity linear in its parameters) of the nonstochastic variables A, B, C. It is well known that "good" estimates of the parameters of such a function (e.g., linear unbiased estimates with least variance) are given by the ordinary partial regression coefficients. It is worth noting that these estimates can be derived from the model without having to specify the form of the probability distribution of residuals, although it is true that narrower confidence intervals may be constructed for the coefficients if we do specify normality of distribution. Actually, the assumption of normality is not inconsistent with the process by which it is assumed that the disturbance is generated, namely the aggregation of numerous minor factors. Furthermore, there is evidence to indicate that moderate departures from normality do not seriously invalidate tests of significance.

The assumption of independence among the disturbances at various points of time is a more serious restriction imposed by the model. However, the condition is applicable not to the observed prices, but to the residuals, and these in practice tend to satisfy this condition more frequently than do the actual observations. It is nevertheless true that with data aggregated in successive intervals of relatively short duration such as weeks or months, serial correlation of residuals may be expected to occur with considerable frequency. The difficulty lies not so much in the lack of independence, as in our ignorance of the degree of dependence to be expected. Given this information, reasonable estimation and testing procedures could be applied.

What can be said about this model? It is undoubtedly crude, but it could be made complex and more realistic by the addition of more variables and by more concrete reference to institutional factors. It is certainly true that the model allegedly accounting for the particular type of economic behavior studied is consistent with the statistical method employed in quantifying the model. But this model bears hardly any similarity to the elaborate theory of price determination developed by economists. If such a theory does provide any information, this information is neglected in the model.

We are thus led to make the following general statements: 1) Classical regression methods may be used as an analytical technique which is logically consistent with certain types of econometric models, but such models by and large must neglect the information provided by existing economic theory. (2) The use of weighted regression in conjunction with existing economic theory entails the unrealistic conversion of all disturbances into errors of measurement.

II

The characteristic feature of existing economic theory is the manner in which economic variables are supposed to be generated. The process is one of mutual or joint determination. If this is so, it is clear that until a statistical process of fitting could be devised which could take into account this aspect of theory, much of the existing economic theory had either to be disregarded or improperly used by the econometrician. The significance of the more recent developments stemming from the ideas advanced by Haavelmo[4] lies in the increasing possibility of countering the abstract schemes of the economic theorist by measurement procedures which are logically consistent with these schemes.

Like many fruitful ideas, the basic idea advanced by Haavelmo is simple. It is to associate the disturbance—which is viewed as generated by the neglect of many minor influences—not with any one variable in the set, but with each equation as a whole, or to be more precise, with the set of jointly determined or endogenous variables in each equation. The disturbances are thus viewed as being independent of the other "predetermined" variables in the system. A complete system will consist of as many equations as there are endogenous variables, and hence there will be as many disturbances as there are endogenous variables. The set of equations may then be considered as a set of functions connecting the endogenous variables and the disturbances. Given a specific probability distribution of disturbances, the joint probability distribution of the endogenous variables may be derived and maximum likelihood estimates of the parameters may be obtained with reference to this joint probability distribution. In general, these estimates will differ from the estimates obtained by applying the

[4] T. Haavelmo. "The statistical implications of a system of simultaneous equations," *Econometrica*, January, 1943.

classical least squares procedures to each of the equations in the system separately.

The implications of this approach may be more clearly understood by considering a modification of the more general solution—a modification which is likely to be used extensively in applied work.[5] We assume for simplicity that the functions descriptive of the structure of the economic activity under consideration are linear in all the variables and that the system is complete. We may then solve for the endogenous variables in terms of the predetermined variables. The disturbance terms, which are now attachable to the endogenous variables proper, will be linear functions of the original disturbances. It is easily seen that we may now apply ordinary least squares methods to each of the equations of the new set separately, treating each endogenous variable as the dependent variable. The estimates of the parameters of the new set of equations of the reduced form—as it has been termed—will have all the desirable statistical properties of least squares estimates for samples of any size, if lagged endogenous variables are not in the system, and only for large samples if lagged endogenous variables appear in the set of predetermined variables.

If we are interested only in forecasting future values of endogenous variables, we may use the reduced form equations without bothering about the initial set of structural equations. As a curious consequence of the use of reduced form equations for forecasting, we may note parenthetically, that a price-forecasting equation, for example, will not have the simultaneous quantity variable in it since both price and quantity are likely to be endogenous variables. The parameters of the reduced form equations, however, will not in general have economic significance. To obtain estimates of the economic parameters, and also possibly to improve our forecasts, we must solve back to the parameters of our original equations. Conditions under which such transformations are possible have been determined. The obvious practical advantage of the method of reduced forms is that it becomes possible under certain conditions to estimate the parameters of a single structural equation without having to estimate all of the parameters of the complete system. But it also serves as a good illustration of what might be

[5] M. A. Girshick and Trygve Haavelmo. "Statistical analysis of the demand for food: Examples of simultaneous estimation of structural equations." *Econometrica*, April 1947.

called the permissive character of statistical representation. The original system of structural equations and the reduced system are statistically equivalent; yet if the former is economically meaningful, the latter is not. The permissive character of statistical representation is not a difficulty peculiar to econometric inquiry. A similar problem arises, for example, in the use of factor analysis in psychology. An infinite number of sets of $k \leqq n$ orthogonal factors may be extracted from a matrix of variances and covariances, or of correlation coefficients among n psychological tests. Of the infinity of sets of k orthogonal factors only one set may have psychological meaning, and the question of how to isolate this meaningful set is the basic problem facing the investigator using factorial methods.

III

The foregoing brief description of the simultaneous equations technique will have to suffice. It is, of course, entirely premature to attempt to draw up even a tentative profit and loss statement on the new approach. The number of relevant published papers is small and the empirical results cited in them are of an illustrative rather than substantive character. Nevertheless, it may be said that a new tool has been fashioned for the econometrician, that it is a good tool, and that the tool is being steadily improved. As is to be expected, new methods generate new problems and also bring into sharper focus some older problems. Among the latter we may mention the problem of aggregation. Other things being equal, the more aggregative a model is, the easier it is to work with, if for no other reason than that fewer variables are involved. On the other hand, aggregation results in a loss of information, and the loss is the more serious since the emphasis is on the determination of structural relations. It is clear that aggregation cannot be avoided, even in micro-economic studies. The question is: how should we aggregate so as to minimize the loss of information? Other technical problems arise in connection with the use of short time intervals such as weeks or months, the possible presence of multicollinearity in the data, the treatment to be accorded to errors of observation, etc.

Some other questions of greater generality than the technical problems listed above must be mentioned. Because these questions are largely of an economic rather than statistical character, they are not likely to be settled by the invention of new statistical techniques or by the elaboration of existing statistical methods.

It is clear from the foregoing discussion that the notion of disturbance is of critical importance in econometric methodology. The specification of disturbance as a random variable provides the sole justification for the use of elaborate methods of statistical estimation. It alone makes possible the statistical testing of economic hypotheses. In other fields where statistical methods are applied there is the possibility of performing what might be called random experiments and greater confidence can therefore be felt that a probabilistic formulation is justified. In econometrics, since the study of economic relations usually involves dealing with historically given, not experimentally produced data, the probabilistic treatment of econometric models is justified only on the grounds of plausibility. The specification of disturbance as a random variable is, in fact, introduced because of statistical convenience, not because systematic observation of economic behavior indicates that we are dealing with phenomena which are basically stochastic in nature. There is a pressing need for an empirical justification of the use of probability, and correlatively for an economic theory, grounded in observation of economic behavior, in which the random element plays an essential part.

DISCUSSION*

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I AM gratified to see a session of these meetings devoted to recent developments in econometric models. In making my brief comments, I am not attempting to pose as an econometrician. In this field, I am a student, not a practitioner. My comments are made from the viewpoint of a director of research in agricultural economics, whose connection with econometrics has consisted principally of assigning some personnel to work cooperatively with the Cowles Commission, supplying data of the Bureau of Agricultural Economics, and encouraging co-workers to familiarize themselves with recent developments in econometric research and to assume a more critical attitude with respect to their traditional methods of statistical analysis.

Cooper's paper may be regarded as the latest of a series by research workers associated with the Cowles Commission, designed to expound the theory and method underlying their econometric work. Although he acknowledges his debt to Haavelmo, Cooper makes a real contribution in his

* A discussion presented at the annual meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 10, 1947.

own right, particularly with respect to organization and clarity of exposition.

In a recent issue of *Econometrica*, Professor J. M. Clark made a plea for communicability between the mathematical economists and others. In my opinion, Cooper has gone a long way toward effecting this communication, but I should like to point out that this obligation is not one-sided. The mathematical economist can go only so far. The non-mathematical economists, of which I am one, must bestir themselves somewhat; and a modest amount of bestirring will go a long way. Cooper's paper is an example of what I mean. At first glance, it may appear to be outside the range of many non-mathematical economists, but willingness to write the solutions of a couple of his equations down on paper, to re-read some chapters in one's favorite "introduction to statistics," and to look up a few Greek letters will appreciably close the gap.

One of the persistent demands of the non-mathematical economists on those who employ mathematics is that the latter express themselves in words rather than symbols. This group ought to be thoroughly satisfied by Kuznets' paper, which accomplishes the remarkable feat of discussing the nature and use of econometric models without employing a single formal equation. But let no one think that his paper is thereby simpler than Cooper's, because one must understand the words, and here again the general economist may have to go back to his statistics and mathemetics to do his share in the task of communication.

To a certain extent, Kuznets covers some of the same ground as Cooper, but supplements the latter in one very important respect—particularly for economists who may be taking their first look at the more recent econometric developments—and that is by tying back to the classical regression methods and giving special emphasis to the difference between treating disturbances as errors of measurement and as random elements associated with each equation in a given structural system.

Although less technical than the other two papers, Johnson's is more ambitious in the sense that he attempts to develop a general approach for the economist's study of policy and to appraise the role of econometric models both generally and in the study of agricultural policy. My general reaction to his paper is that it is too ambitious. I agree with him thoroughly that the study of economic policy requires consideration of the means-end problem and also with his choice of the second horn of the basic dilemma which he poses. I agree also that economists studying policy need to make more explicit exactly what facets of policy they are analyzing and the assumptions which determine their conclusions.

I have doubts, however, that Johnson's means-end schema constitutes a way out for economists concerned with the study of policy. My own ideas as to the basic issues that need to be clarified cannot be developed within the compass of these brief comments. But I might say that they are very much the same as those elaborated by Professor O. H. Taylor in the *Review of Economic Statistics* for May of 1947. The root problem is whether the economist is going to formulate his means in terms of ends accepted in the past, or in terms of a new set of ends emerging in our present

society, and further, whether the economist will increase the scope of his work to the extent of actively contributing to the formulation of a scheme of ends, that on the one hand satisfies the aspirations of the present age, and on the other is sufficiently coherent and stable to permit the development of the best means for their attainment.

Turning to the papers as a group and the general issues to which they are all addressed, I think it is fair to say that the exposition of the nature of current econometric models has now become clarified to the extent that the general economist can grasp their basic meaning and gain real economic insight from many of the extant studies.

The econometricians, it seems to me, have made clear the major implications of their concepts and method, including explanation of the roles of the exogenous and endogenous variables; and the nature and use of structural equations in quantitative analyses as contrasted with the use of standard regression methods. I think, personally, that there could be some further clarification of the rationale of the reduced form equations and of the relation between the coefficients in the reduced form and the structural parameters, although these questions may not present any particular problem to many persons at this meeting.

I think it needs to be recognized, as Kuznets has emphasized, that most of the published econometric work has been illustrative rather than substantive and, as Johnson has pointed out, that the construction of econometric models is time-consuming and expensive. I might also note a number of other problems, usually mentioned by the econometricians themselves, namely, the problem of obtaining time series which measure the variables we wish to investigate; the problem of errors in the data; the necessity of working with small samples, and the characteristic assumption of linearity in the relationships. I would also add, from the point of view of a forecaster, that the present necessity of treating some of the more important variables in the economic system as exogeneous greatly limits the aid which econometric models currently afford in the prediction problem.

Finally, I think that the econometricians have tended to overemphasize the importance of their studies for policy. This is true not only of the present papers, but also of the articles by Haavelmo, Koopmans, Marschak and Klein. Of course, the ultimate test of the econometric models will be in their application to policy. But meanwhile, the major contributions take the form of clarification of economic concepts; a closer tie between economic theory and statistical methods; a more accurate understanding of the limitations of the more traditional methods of statistical analysis, and the testing of important economic hypotheses, such as those in the Keynesian system. In short, I think that the econometricians may be overselling themselves a bit on the significance of their methods for policy, at least in the immediate future, while neglecting to emphasize other very important contributions which they are currently making.

NOTES

A FARM INCOME STABILIZATION PROGRAM COULD BE SELF-FINANCING*

IS AGRICULTURAL price and income stabilization only a one-way matter?

Programs for stabilizing agricultural prices during the 1930's meant "stabilizing them upward." This phase well reflects the depression situation of the times. It also reflects the real purpose—raising agricultural prices rather than stabilizing them—and the naive economic idea in the minds of many of the proponents of stabilization that prices could be raised over a period of years merely by fiat, or by fiat plus storage operations.

During the 1940's, several things happened to reveal the one-sidedness of this view of stabilization. The demands of war were so insatiable that prices had to be held down rather than up. During the war and for several years afterward, agriculture became prosperous rather than poverty-stricken. And economic ideas became less naive as economic education became more widespread. The layman now is beginning to realize that a storage program to stabilize prices against variations in supply must take out of storage in short crop years as much as it puts into storage in large crop years. Thus it must reduce prices during years of short crops about as much as it raises prices during years of large crops.

It is time now for agricultural economists to consider a similar question with respect to programs to stabilize agricultural prices and incomes against variations in demand. Should these programs reduce prices and incomes during booms as well as support them during depressions?

Very few agricultural economists have discussed this idea in print. It seems to me that we should answer the question whether stabilization against variations in demand still means only stabilization upward, or whether the stabilization should work both ways.

Stabilization Should Work Both Ways

Programs to stabilize farm incomes against variations in demand by "price supports" (such as the existing program) are de-

* Journal Paper No. J-1517 of the Iowa Agricultural Experiment Station, Project 1013. I am indebted to Frederic V. Waugh, Don Kaldor, Wallace Wright, John Timmons, and Earl Heady for their comments, even though we do not all agree on several important points.

fective on several counts. Their stabilization base is parity, which in most cases goes back to 1909–14 price relationships, making no allowance for the great changes in production technology and in demand that have taken place since that time. And if these programs support prices above market levels, they result in surpluses that cannot be sold at the price support level and sooner or later break the program down. New programs that have been proposed to replace the "price support" programs are "income-support" programs. They would leave prices free to clear the market, but would support farm incomes during depressions by direct payments from the Federal government to farmers.

These proposed programs suffer from two or three major weaknesses. If they supported incomes only in time of severe depression, when farm incomes were very low, they would do only a partial job of stabilization. They would involve a considerable drain on the public Treasury, running into the billions. And they would not attain their implied objective of raising farm income per capita over a period of years, in spite of their high cost to the public.

The first weakness (only partial stabilization) could be overcome by expanding the program so that it would support incomes, not merely during depressions, but close to boom levels all the time. The trouble is that using this remedy for the first weakness would make the second weakness worse. It would very materially increase the drain on the public Treasury. This drain is objectionable from the farmers' point of view as well as from the tax payers'; a considerable amount of the farm organizations' objection to this sort of program arises from their feeling that it would put farmers in the relief-receiving class and make their incomes directly dependent upon appropriations from the public Treasury. This would be bad enough if incomes were supported only during depressions; it would be much worse if incomes were supported most of the time.

Furthermore, the payments would increase total agricultural income, but they would not increase agricultural net income *per capita*, which is the thing that counts. Net income *per capita* depends upon the number of people in agriculture as well as upon the size of the total agricultural income. Keeping total agricultural income at boom levels all the time would simply inflate land values and reduce the normal flow of excess population off farms until net farm income per capita would be no higher than before.

The distribution of the income is an important factor here too.

It is in fact a whole problem in itself. But it leads off the main track of our discussion and cannot be adequately treated in this note.

Per capita net farm incomes cannot be raised over a period of years simply by raising agricultural prices or incomes. If that is all that is done, the same competitive forces that previously were at work would continue to allocate human and capital resources between farm and non-farm occupations so that *per capita* net farm income would remain at about its previous level in relation to non-farm income.[1]

Fill in Depressions with Chopped-Off Peaks

The two major weaknesses of present and proposed programs for stabilizing agricultural prices and incomes upward that are outlined above could be remedied at one stroke. The troughs in agricultural income could be filled in, not with funds from the public Treasury, but with funds accumulated by cutting off the peaks in agricultural income during booms.

This program would finance itself. Farmers then would stabilize their incomes with their own money. And their *per capita* net incomes would average as high over a period of years as if only the troughs were filled in at public expense, for the reasons given in the last paragraph of the preceding section.

In addition, the program would tend to counteract general inflation as well as general depression. It would reduce farmers' spending and saving, which spread through the whole economy; and the proceeds of the tax could be used to retire bank-held government debt.

Proponents of payments to farmers during depressions have stressed the "counter-cyclical" effects that such programs would

[1] Per capita net far income can be raised over a period of years, however, by appropriate measures. The chief reason why per capita farm incomes average low is that agriculture has an annual surplus of population of about half a million a year. This surplus depresses per capita farm income until the difference between per capita farm and non-farm income is great enough to overcome the hindrances or difficulties involved in moving off farms into non-farm jobs. These hindrances or difficulties are lack of general education (rural schools are notoriously inferior to urban schools in most states), lack of specific training for urban jobs, and lack of knowledge of where these jobs are and how to get in touch with them.

The remedy for low farm income, then, is plain. Reduce the handicaps to the movement of young people off farms, and thus reduce the difference between the relative per capita income on and off farms that is required to counterbalance those handicaps. If the handicaps could be reduced to zero, the difference in income levels could be reduced to zero. I know of no other way of doing it.

have on the whole economy during depressions. But, as J. K. Galbraith pointed out at Green Lake last fall, those programs would only be "counter-depression," not "counter-cyclical." A program to pay farmers during depression from funds accumulated from farmers during booms would reduce booms as well as depressions. It actually would be counter-cyclical.

Idea Simple, Execution Difficult

The idea of cutting off income peaks as well as filling in troughs is simple. Its execution, however, would be difficult.

One difficulty requires immediate consideration. Some observers object that farmers as a group would never accept a program which would reduce their incomes at any time, boom or otherwise.

I believe that this objection has been over-rated. There is considerable evidence that most farmers themselves consider agricultural prices now too high. Many farmers believe that they would benefit if, for example, $5 per 100 lbs. were taken off hogs now, to be put back later on when hog prices are far below normal. Most farmers remember that hogs were $3 per 100 pounds in 1932 and 1933; $30 hogs now are as much out of line in the other direction. If the price peak were reduced to $25 and the trough were raised to $8 that would stabilize incomes to a considerable extent.

The problem is how to take $5 off now, and how to pay it back later.

The neatest solution would be to levy a $5 processing tax on hogs now, and pay a $5 processing subsidy later. The United States has had experience with processing taxes in the 1930's and subsidies in the 1940's, and statistical analysis has confirmed the expectation based on economic theory that they are both passed back to farmers during the year or so before they have effects on production.[2]

The proportion of the tax passed backward to producers and forward to consumers depends inversely upon the relative elasticities of supply and demand. During a production period (roughly a year for most farm products) the elasticity of supply is very low and nearly all of the tax would be passed back to producers (i.e., the price to farmers would be lowered by practically the full amount of

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[2] U. S. Treasury Department, *Analysis of Processing Taxes*, 1937; and "The Incidence of the AAA Processing Tax on Hogs," this JOURNAL, XVII: 2. May, 1935, by the present author.

the tax, production would remain practically constant, and prices to consumers would also remain practically unaffected).

A tax on any one farm product would depress its price relative to the prices of other farm products, and after a year or so, farmers would produce less of that product and more of other products. But agricultural production as a whole is very inelastic, and a tax applied to all farm products during booms would not appreciably reduce agricultural production as a whole. Farmers would produce almost as many hogs at $25 now as at $30, and as much cotton at 25 cents as at 30, if the prices of other farm products were proportionately lower too. Agricultural prices vary so much from boom to depression, and production records show that agricultural production as a whole is so nearly inflexible, that cutting the price swings in half would still produce almost as much production response as we have had in the past.

A more difficult problem would be to reach agreement on the base above which to tax farmers and below which to pay back to farmers.

This base should be as recent as possible, yet founded on underlying forces so as not to be unduly affected by the short-run aberrations it is designed to correct. It should not be so rigid as to impede adjustment to changes in production technology and to underlying changes in demand. For these purposes, the base should be a range rather than a point. The problem would be less difficult if it were handled as a single problem for agriculture as a whole than if it were handled separately by commodities.[3]

Administrative Difficulties

The great stumbling block hindering the adoption of this sort of program, however, is the purely administrative problem of tax evasion and black markets. The desire to evade the income tax would exist even though most farmers believed that farm prices were too high, just as it exists now among economists who believe that income taxes are too low.

This problem would be particularly difficult in the case of those farm products that are not much processed but are merely handled in their original form from producer to retailer. These products would have to be included for reasons of equity, and because if the

[3] More extensive but still inadequate suggestions concerning the base problem are made in my "Agricultural Price Policy," 1947, pp. 396–400.

tax were levied only on some products, it would depress their prices relative to others and divert production from the one to the other.

The administrative problem of evasion and black markets baffles me. It baffled the OPA after the end of the war, and was a major factor contributing to the OPA's untimely demise. It is so difficult that it practically precludes the use of processing taxes as a workable device.

If this is true, what other means can be used?

One possibility is a retail sales tax on farm products. This tax could be collected on non-processed products as easily as on processed ones. It probably would be denounced as a tax on food. Perhaps it could be defended against this charge, in academic circles, since it would nearly all be shifted back to the farmer, not forward to the consumer, for the reasons given at the end of the preceding section. But this argument probably would not carry conviction with the consumer; he would feel that he was being taxed in order to help farmers through a depression; and that would be a formidable political obstacle to its adoption.

In any case, regardless of the outcome of this argument, a retail sales tax would run into the same administrative problems as a processing tax—evasion and black markets.

The sales tax would have to be substantial (say 10 or 15 percent)[4] in order to accomplish its purpose. A tax of this magnitude would set up a strong incentive to evasion. The incentive would not be so large in dollars per transaction as in the case of processing taxes, for consumers buy in small amounts each time. But the difficulty of policing would be greater than in the case of processing taxes. Consumers are very numerous, in the first place; and most of them would consider the tax an imposition on top of an already high cost of living and would feel a moral as well as financial incentive to evade it.

When these things are taken into account, it seems likely that retail sales taxes would be impractical.

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[4] Expenditures for food in all forms, valued as purchased in stores, restaurants, schools, or other places, and including food furnished government employees and military personnel and consumed on farms, amounted to 42.9 billion dollars in 1946. Some of this would be untaxable, for instance, the home-produced food which amounts to a considerable item, especially on farms.

Income Taxes

In view of these considerations, I believe that the best way to build up a "war chest" during booms is to levy a tax, not on farm products, but on farm incomes.

The tax would be a special, additional income tax, like the social security (unemployment) tax. It would be levied only on that portion of a man's earnings that come from farming (including "land lording" as farming).

This additional income tax could be progressive, increasing in percentage terms with increasing income, like the regular income tax. Or it could be a uniform tax per unit of net sales, thus varying only directly and proportionally (not progressively) with individual income. This kind of tax would be similar to a sales tax, but would be collected from the producer like an income tax.

There are some grounds for considering this second (non-progressive) kind of tax. The purpose of the tax is (in effect) to stabilize agricultural prices. What we would like to do is to keep agricultural prices more stable than they have been; in terms of our earlier illustration, we would like to see $25 and $8 hogs rather than $30 and $3 hogs. But since we cannot stabilize prices directly like this, for reasons given above, we are endeavoring to accomplish the same thing by taxes.

For this purpose, the tax should be so much per unit of sale—$5 per 100 pounds, for example, perhaps 6 cents per pound of cotton, etc.—regardless of the size of a farmer's income, so as to give farmers the same income as if actual market prices were lowered $5 per 100 pounds. Most of the plans suggested for supporting farm income during depressions call for payments per unit of gross or net sales. If the tax is going to be paid out on a sales basis, that is an argument for collecting it on the same basis. Furthermore, an additional progressive income tax would reduce incentive on the part of large successful farmers (those with large incomes) more than it would reduce incentive on the part of small farmers (with small incomes). A sales form of tax would treat them more nearly equally.

To get to the bottom of the matter, we need to go back to our objectives. What are we trying to do? Are we trying to maintain individual farmers' business incomes at their individual long-time average levels, the same as they would be if there were no booms or depressions; or are we trying to put a bottom under farm incomes at some uniform minimum standard-of-living level for all farmers?

Or to ask the same questions in another way, are the payments during depressions supposed to maintain the distribution of income in agriculture that exists under average open market conditions; or are they supposed to reduce that distribution toward a more uniform figure for all farmers?

It seems to me that our purpose is stabilization, not equalization. In principle, therefore, we should use the sales form of tax. But here, as in the case of the processing taxes and retail taxes discussed above, the administrative problems involved would turn the scales the other way. The income tax is, I believe, the most workable alternative.

The sales form of tax would be levied on all farmers alike—those with large incomes, those with small incomes, and those who for one reason or another had zero incomes or negative incomes. By contrast, the income tax would be levied only on those farmers who have any income to tax. It seems to me that this is a strong argument for using the income tax rather than the sales tax. In actual practice, the difference between the two (in the case of the bulk of the farmers who had incomes to tax) would not be large, since the rate of progression of the income tax is not high in the lower brackets where most farm incomes fall.

Individual or General Income Stabilization?

A final important question remains: are the proceeds of the tax to be kept in separate accounts for each individual farmer, to be paid back to him and him only when depression comes? Or are they to be put into a general fund to be drawn upon for general payments later, unrelated to the amounts each individual put in?

The individual basis is attractive in some ways, but I believe the general basis is superior. There are several reasons for this conclusion.

If the individual basis were used, what would you do about John Smith, who was farming during the boom but who went into some other occupation, retired and moved to town, or died, before the depression? Would you pay the money to him, or to his heirs, if none of them were farming? If you did, you would not be stabilizing *agricultural* incomes. If you did not, what would you do with the money?

One answer to the last question is—pay it to William Jones who was not farming during the boom but is farming during the depression. And that is a sensible answer, because the objective is to

stabilize the incomes of people who are engaged in agriculture, regardless of whether they were so engaged during some earlier period.

The movement into and out of agriculture over say a period of 10 years, as from boom to depression, is high. Over the past 15 years on the average about a million and a half persons annually moved from farms to urban occupations. At the same time, nearly a million persons annually moved to farms from urban occupations. The movement from and to farms would be so great by the end of a 10 year period that many—perhaps most—of the accounts could not be handled on an individual basis, but would have to be paid into and out of a general fund. It would be advisable, therefore, to handle the whole fund as one fund rather than as several million individual farmers' separate funds.

The use of special additional income taxes on farmers, of the kind outlined above, during the period from 1941 to 1947, would have built up a reserve fund of more than 10 billion dollars. A fund of this size would have reduced inflationary pressures during that period, and would have provided a substantial backlog to support farmers' incomes during a depression, without putting farmers in the position of being dependent upon appropriations from the public Treasury.

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DISTRICT COURT UPHOLDS CONSTITUTIONALITY OF MARYLAND FOREST CONSERVATION LAW

IN THE March term 1947, the Circuit Court for Garrett County, Maryland, upheld the constitutionality of the Forest Conservancy Districts Act of 1943 in a test case involving two sawmill owners operating in violation of the rules and regulations promulgated by the Commission of State Forests and Parks.[1] This decision is highly important as a precedent for the protection of the public's interest in private forest land—the management of private forest lands so as to maintain its productive capacity on a sustaining basis. This act represents one of the first attempts to regulate management and cutting practices on private forest land. Since this act was passed by the Maryland General Assembly, similar laws but with a more restricted field of activity have been passed by the legislatures in both California and New York.[2]

[1] *Md. Ann. Code Gen. Laws (Flack, Supp. 1943)*. Article 39A, Secs. 53 to 64 incl.

The Act

A chief objective of the Maryland Forest Conservancy Districts Act is to encourage economic management, scientific development and conservation of private forest lands in the State. To achieve this objective, the act provides that the Commission of State Forests and Parks divide the State into as many convenient districts as may be appropriate and that it shall establish, by appointment, in each such district a District Forestry Board to administer the act. In addition to promoting private forestry by assisting land owners in forest management through dissemination of information and giving advice, it is the duty of the Board to receive and pass on proposed work plans for the cutting of forest land and subject to the general jurisdiction and regulation of the Commission of Forests and Parks, perform all acts reasonable and necessary to attain the objectives of the act.

The District Forestry Board or its agents are given the power to enter upon any woodland in the county or district in the performance of its duty and to enforce any and all rules and regulations made by the Commission of State Forests and Parks.

The District Forestry Board has more influence in the formulation of rules and regulations than first seems apparent. Each local Board shall suggest tentative rules of forest practices, publish such tentative rules in one or more newspapers, and hold public hearings thereon. The proposed regulations are then presented to the Commission of State Forests and Parks, and if approved by it have the force of law.

It is the responsibility of each person engaged in sawmill operations or other forest products business to secure a license issued by the Commission of State Forests and Parks and to report to the Commission changes in location or the establishment of new mills.

Owners and lessees who desire to cut woodland must make application to the District Forestry Board setting forth the proposed plan for cutting and management of the forest land. The proposed plan must give reasonable assurance of accomplishing the following objectives of the act:

1. Conditions be left favorable for regrowth;
2. Seedlings and saplings be protected during logging operations;
3. Seed trees be left for restocking when land is clear cut;

[2] For a description of the administration of the Maryland Act see: Kaylor, Joseph F., "Maryland Regulates Her Forests," *State Governments*, Vol. 20, No. 6, June 1947.

4. After partial cutting or selective logging adequate growing stock be maintained in accordance with the rules and standards of forest practices adopted by the Commission of State Forests and Parks.

Provisions of the act do not apply to the clearing of woodlands for reservoirs, military, naval, agricultural, communication and transmission lines or industrial sites, railroad, residential, or recreational purposes. Neither do they apply to the cutting of firewood and timber for domestic use for the owner or his tenant. The act, however, specifies that any rules and regulations promulgated shall provide for a procedure by which any operator of forest land may secure a permit to clear-cut particular lands upon proof:

"(a) That he has a bonafide intention of devoting the land to other than forest use;
"(b) That the lands are appropriate for the proposed use;
"(c) That devoting the lands to such new use will not seriously interfere with the protection of the water shed."

All persons intending to clear-cut forest land must obtain a permit to do so but they will be exempted from the provisions of the act if they show proof that they intend to use the land for other than forestry purposes and that such use will not be inimical to the public welfare. The Commission of State Forests and Parks thus has the power to limit certain land to forestry and watershed protection uses.

Appeals from the decision of the District Forestry Board may be taken first to the Commission of State Forests and Parks and later to the Circuit Court of the county in which he is a resident, or, if he is a resident of Baltimore City, to the Baltimore City Court. An important provision of the act is that the findings of the facts established by the State Commission shall be final.

Any person violating the provisions of this act, or of rules or regulations made by the Commission of State Forests and Parks or by the District Forestry Board, with the approval of the Commission, shall be deemed to have committed a misdemeanor and shall be fined not less than $10 nor more than $500, or imprisoned for not more than six months.

It can be seen from this brief review of this act that the State is given considerable power in setting forth what is to be good forestry practices on private forest land, and that it provides for going considerably beyond the mere dissemination of information in accomplishing the objectives set forth. The rules and procedures

promulgated by the District Forestry Boards and the Commission of State Forests and Parks have the force of law and are enforceable; violation calls for punishment through fine or imprisonment. It is little wonder that early attempts were made to test the constitutionality of this act.

The Case

Early in 1947 warrants were issued against two defendants, charging violation of the Forest Conservancy Districts Act in that they operated sawmills in Garrett County without securing licenses from the Commission of State Forests and Parks. Both were cutting and selling timber from their own properties located in Garrett County. One of the regulations of the Commission provided that charges for license fee be $10 per annum for all resident operators and $25 per annum for nonresident operators. One of the defendants was a resident and the other a nonresident of Maryland.

A motion was made by the defendants to set aside both warrants. The reasons given were:

"(1) The title to Chapter 722 of the Acts of 1943 is defective.
"(2) The Act itself is unconstitutional.
"(3) The Act does not authorize the Commission of State Forests and Parks to charge for a license.
"(4) The greater charge for a license to an out-of-the-state operator is discriminatory and, therefore, invalid."

The act was upheld in the opinion rendered in the Circuit Court for Garrett County, March term 1947, by Judge George Henderson. The decisions on each of the points at issue will be discussed.

Is the Title to the Act Bad?

The constitution of Maryland (Section 29 of Article 3) provides "... and every law enacted by the General Assembly shall embrace but one subject, and that shall be described in its title."

The Court stated that there have been cases where the Court of Appeals has held titles to be bad. The causes usually were that the title had actually been misleading, insufficient to put the reader on guard as to the contents of the act, or had actually embraced more than one subject. In a former case involving a title which read: "An Act to add an additional Article to the Code of Public Local Laws to be entitled 'Garrett County'," the Court upheld the title as good. Former decisions held that it was not necessary that the title summarize the contents of the act. In conclusion to this point the Court

stated, "A careful reading of the act in question discloses nothing that is not germane to the subject of 'Forestry' and 'Forest Conservancy Districts', and, therefore, the title must be held good."

Is the Act Constitutional?

In reviewing the act for constitutionality the Court found that the objectives set forth were well within the scope of the Police Power, which can be used in aid of public welfare, health, morals, or safety. The right of the General Assembly to delegate regulatory power, as in this case to the Commission of State Forests and Parks, has precedence in numerous zoning cases. It warned, however, that the regulations adopted by the Commission must comply with the general rules limiting the State itself in its exercise of its Police Power.

As stated in the review of the act, an individual may appeal to the Commission of State Forests and Parks if he does not agree with the decision of the District Forestry Board. Further appeal may be made to the Circuit Court of the county in which the appellant is a resident, or if he is a resident of Baltimore City to the Baltimore City Court. However, the findings of the facts established by the State Commission "*shall be final.*"

It was in the appeal procedure that the Court found cause for doubt as to constitutionality in that an out-of-State landowner seemed to be denied the right of appeal to any court and a resident owner is not allowed an appeal on the facts, although the Commission may have sharply limited the owner's right to cut his own forest land. The Court pointed out these weaknesses in the act but refrained from rendering a decision on them as the defendants were not charged under the section of the act covering these points. They were brought into court for failure to pay the license fees.

The Court ruled that "The Act as a whole is constitutional; and protection to rights of individuals is assured by the power of Courts to decide whether the acts of the Commission or its subordinate agencies 'are upon the facts of the case reasonably necessary to the protection of the public welfare'."

The act has the usual separability provision in that if any one provision is held to be invalid that it shall not affect the validity of any other provision of the act.

Can the Commission Charge for Issuing a License?

Cases were cited showing that when the legislative branch of the

government has granted the power to license and regulate that such grant gave authority to charge a reasonable fee. "In view of the wide regulatory powers conferred upon the Commission, including the power to adopt rules and regulations 'which shall have the force of law' (sec. 56), the right to charge a reasonable license fee is within the powers granted by the Legislature to the Commission."

Can a Nonresident Sawmill Owner be Charged $25 for a License When the Resident Operator is Charged Only $10?

In earlier Maryland cases it had been decided that the equal protection clause of the 14th Amendment to the United States Constitution did not take from the State the power to classify in the adoption of police laws. It avoids what is done only when it is without any reasonable basis and therefore purely arbitrary.

The Court reasoned that the higher license fee for a nonresident was reasonable, as it was not high enough to keep out nonresident operators in favor of residents of Maryland and that there were more costs involved in administration of the law with respect to nonresident woodland. In the administration of the act it is necessary to inspect areas or properties to see that the law is complied with. In the case of resident operators, inspection " . . . need not be so frequent, since there is not the same danger of violation by one who lives here, and who, therefore, can less readily escape the penalty of violation." On this point, the Court concluded: "It must be admitted that this higher fee raises a close question; nevertheless, in view of the burden which rests on those attacking the constitutionality, the Court believes it should hold that there has been reasonable classification, rather than arbitrary discrimination."

Both defendants were declared guilty and "As in both cases there has been a bona fide attempt to test the constitutionality of the Forestry Law, rather than merely to evade the payment of the license fees, there will be a fine and not imprisonment; and in both cases the fine will be $50."

Comments

This act may again be tested, especially on the questionable point of denying an out-of-State resident the right of appeal to the Courts. However, now that the Court has pointed out the possible invalidity of the appeal provision, the General Assembly of

Maryland may amend the act, and thus further strengthen its constitutionality.

The present favorable Court decision on the Forestry Conservancy Districts Law opens vistas of broadened State cooperation with private forest land owners in the interest of resource conservation and future public welfare. With the creation of Forestry Districts and District Forestry Boards rules and regulations may be promulgated to fit the needs of local situations. It is not to be expected that these rules and regulations will be severe since such a policy would undoubtedly result in unfavorable public sentiment and an early repeal of the law. The establishment of Forestry Districts and local governing boards provides a legalized medium of local representation through which the State Commission will operate. There will be better opportunities of making forest land owners conservation minded so that good forestry practices will be more widespread.

The Maryland Forest Conservancy Districts Law puts the State's private forest landowners on trial as to whether they will be willing to submit to mild limitation over the use of their private property in the interest of the general welfare. The success of such a law in achieving the objectives set forth depends much upon the personal factors of administration and the extent that private owners are informed as to the needs of forest resource conservation prior to the promulgation of specific rules and procedures having the force of law.

This first court test of the Maryland Forest Conservancy District Act was not appealed to a higher court. Administration of this and similar acts in other States warrant close observation on the part of those concerned with conservation of the Nation's forest land resources.

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THE INDUSTRIAL ALTERNATIVE FOR FARMERS

MANY agricultural economists have proposed emigration from agriculture as a long-run means of raising farm income levels. Implicit in these proposals is the assumption that industrial employment can serve as a more desirable alternative to the primary production of foods and fibres. From quantitative investigation of the flow of farm people to urban occupations the conclusion

has been reached that sustained industrial employment opportunities are a prerequisite to the achievement of a more advantageous income "equilibrium" for agriculture. Full employment in non-agricultural industry (which can be taken to include off-the-farm processing and marketing of foods and fibres) is considered a goal of economic policy. The pervasiveness of the concept of a full-employment economy as well as its welfare appeal have shadowed the need for understanding of the consequences entailed in movement from agriculture to industry. Yet, judgment as to the efficacy of emigration in improving economic standards for farm people is too important a decision to rest on patent correlation between the phase of the business cycle and numbers moving from agriculture to industry.

To date, little analysis of emigration consequences "within agriculture" has been developed by economists, nor have the experiences of farm to industry transferees been evaluated. The declining numbers engaged in agriculture has been taken as evidence of the fluidity of internal adjustments in agriculture. Drawing off of labor in large quantities during the war has apparently emphasized the same flexibility of farm production function, with man-power apparently among the more flexible of the coefficients of production. The absorption of millions of actual and potential farm producers into the industrial labor force, especially in periods of high levels of aggregate industrial employment, seems to indicate a complementary adjustment in the non-agricultural labor force. Economists have long urged that comparison of alternative returns would, in general and with considerable stickiness, guide labor force allocation. More recently job opportunity as an incentive to occupation shifting, has received much attention. Both economists and sociologists have thrown light on "push" forces that urge movement out of agriculture. Investigations as to the size of emigration from agriculture and some of the characteristics of the migrants have extended our understanding. While actions of particular individuals cannot be predicted, we can now venture more than haphazard guesses with regard to the socio-economic attributes that influence the decision to leave farming.

Work undertaken by the writer (in 1946–1947) at the University of Wisconsin yields some considerations, based on the experiences of Wisconsin farm people, that may be of interest elsewhere. Examination of the industrial work records of several hundred men

who entered non-farm employment from Wisconsin farms, from World War I through World War II, was the core for the observations. As a caution, it should be noted that the data were drawn from records of 1946–1947 applicants at a publicly operated employment agency. Possible distortions in the representativeness of the sample include overemphasis upon service workers, and disproportionate numbers of "unemployables." Over representation of women among employment seekers is eliminated as a difficulty since women are omitted from consideration here. Offsetting the possible malrepresentation is the relative randomness of 1946–1947 job applicants, as a result of both the post-war fluidity in the work force and the fact that applicants included men temporarily unemployed (due to material shortages, strikes, or direct reconversion) who sought unemployment compensation. This source was supplemented by interviews with entrants, personnel administrators, union leaders and public officials. Six centers of non-farm employment in Wisconsin were the loci of the investigation, including the southeastern cities of Milwaukee, Madison, Janesville and Kenosha, Rhinelander in the northeast and Eau Claire in the northwest.

Transition from agriculture to industry, for the group studied, did not entail an abrupt shifting from one kit of skills and work to another. The kinds of jobs rural people undertake in industry appear to lean heavily on farm-acquired skills, especially in the early years of non-farm work. Modal industrial beginnings are made as truckdrivers, rough-carpenters, laborers in meat-packing establishments, or as unskilled workers in creameries. Entrance from the farm into clerical, administrative, sales, or other "white collar" work, is extremely rare. Channeling this development are the inclination of the entrant to seek out familiar work, the relative abundance of such jobs, and a distinctive employer psychology. Personnel managers repeatedly expressed the notion that farm work fits rural men for some industrial occupations better than does urban life. This psychology also attributed to farm men a willingness to perform heavy manual labor, a patience with sustained routine, and ability to withstand long hours of arduous work. It should be noted, however, that as rural men attain industrial experience, subsequent employer judgments de-emphasize the rural background.

Entrance into industry, for Wisconsin's rural men, in the main

was from the family farm to the nearest job source. All industrial areas studied drew most heavily on rural people located within a sixty-mile radius, with entrants most densely concentrated within thirty miles of the industrial center. Further, of 302 farm-reared men entering southeastern industrial employment (in Madison, Janesville, Kenosha and Milwaukee) only 13 were from 18 northern "cut-over" counties in the state. Employment managers in these cities repeatedly noted that of their farm-born employees, "few were from the north." The search for employment close to home probably reflects in part the farm status of emigrants to agriculture. As a farm hand on the family farm, the typically young entrant to industry does not possess capital—either in liquid assets or technical training—to seek opportunities far afield. In part too, the attempt to find work locally is based on a greater familiarity with the local labor market through personal contacts and observation. The widespread existence of off-the-farm work among Wisconsin farmers enforces this observation. Localization of job transfer from agriculture to industry in the post-war years is especially attributable to the ubiquitousness of employment opportunities and blocks to the enjoyment of these opportunities. The former facilitates getting work close to home, the latter increases the risk of seeking work in far removed places. Housing uncertainties and movement costs in particular, block the transfer from agriculture to distant industrial work. In effect then, home farm location seems to act as a binder, with the accessible centers of industry (i.e., cities within daily driving distances) acting to a considerable degree as the initial limit to the industrial horizon.

In a real sense, the initial industrial job marks the barrier between two distinct economic orientations for farm-reared men. Once entrance to industry is undertaken, erstwhile farmers focus attention on adjustment to industry. The initial job also tends to set the pattern for the skill and income level for rural entrants. Unskilled or semiskilled beginnings in industry tend to be perpetuated through the farm emigrant's work career. Among the entrants who hold two or more non-farm jobs, the latest job held was of a similar skill level to the first job. In effect the barrier job serves to establish rural people in industry, over half of the sampled group in five of the sampled areas (Milwaukee excepted), remaining on their initial jobs for at least a year. Barrier jobs also are likely to provide the longest periods of sustained industrial experience.

Jobs continuously held for five or more years, though relatively few in number, were mainly the barrier jobs:

Farm entrants to:	No. holding jobs over 5 years	Barrier jobs as 5 years and over jobs
Madison	25	20
Eau Claire	16	13
Rhinelander	13	11
Janesville	40	33
Kenosha	7	7
Milwaukee	4	4

The cyclically timed arrival of farmer entrants to industry is in keeping with evidence repeatedly reported. Of a group of 560 farm-born men seeking work in 1946 Wisconsin industry, 198 reported first working in non-farm occupations before 1940. Yet the men entering prior to the present decade had on the whole actually changed jobs less frequently than the more recent entrants and, despite the broadened opportunities of recent years, seem to have made equal skill progress in industry. Interestingly enough, barrier job stability was much greater for entrants during 1931 through 1939 than for those beginning industrial life in subsequent years. Among the entrants during the thirties, six percent held the initial job for one year or less, while 57 percent of the entrants during the forties were in this category. This data may reflect a propensity to shift occupations frequently when several alternatives are available. In view of the stickiness of skill and wage levels among rural entrants, however, job turnover cannot be taken to indicate the attainment of more attractive alternatives.

What issues does such an investigation help point up? Most importantly, the inference is that the industrial alternative cannot be considered applicable with blanket force. Leaving the impacts on agriculture out of consideration though their effects are likely to be substantial, a long-run policy of contracting the aggregate farm labor force appears to require more precise shaping. Consideration should be given to the possibility that farm insecurity may be exchanged for drawbacks in industrial employment. A tendency for a frozen economic status in industry closely adhesive to skill and income levels at entrance must be dealt with. The rather unstrategic position of rural people in industry, consequent upon their position in the scales of level of education, technical training, asset accumulation, practiced skills, and industrial seniority, makes prog-

ress in industry difficult. Even in times of near full employment, blocks to procurement of non-farm opportunities are substantial. Locational immobility, a characteristic of the labor force not confined to farm people entering industry, raises secular problems of bringing opportunities and men together.

To be sure, these considerations have not been entirely neglected. Efforts are constantly being made to help farm people prepare themselves for either farm or non-farm work alternatives. What is in order is a re-evaluation of the effectiveness of the efforts already in motion along with a search for ways in which farm people can make meaningful decisions that will enrich their economic careers. The latter search would appear to entail teamwork among social scientists in attaining comprehension of the intertexture of the total economy and applying the insight gained to problems of allocation alternatives. As criteria in this task, the following are suggested:

1. Non-farm employment opportunities be a constant of the economy.
2. The kinds of industrial employments offer opportunities to raise income levels, living standards, and prospects of security.
3. Tasks and skills in industry represent progress over farm work alternatives.
4. The costs of transfer to industry not be so burdensome to the individual as to mortgage his economic future.
5. Transfer be accomplished by those farm people whose loss will not endanger the fulfillment of agriculture's responsibilities to the economy.

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LOW-COST ADEQUATE DIETS

THE *Journal of Farm Economics* in its May 1945 issue carried an article by Dr. George Stigler entitled "The Cost of Subsistence." The article itself and later reference to it give evidence of misunderstandings that need to be clarified since they bear on food policy and the use of low-cost food plans. The author's failure to consider certain important physiological, chemical and cultural factors has subsequently been pointed out.[1] The comments which follow relate to (1) the concept of subsistence, (2) the current food plans of the U. S. Bureau of Human Nutrition and Home Eco-

[1] Comments on "The Cost of Subsistence" by George J. Stigler, Martha Potgieter. This JOURNAL, August 1947.

nomics, (3) other methods of developing low-cost food plans, and (4) the need for a critical approach to low-cost food plans.

Since some readers may not be acquainted with Dr. Stigler's article, a brief summary is given here. His objective was to determine "the minimum cost of obtaining the amounts of calories, protein, minerals, and vitamins" accepted as adequate or as optimum. His yardstick was the recommended dietary allowances of the National Research Council. In order to select foods for his "subsistence diet" he first determined for 77 common foods the quantities of the various nutrients that could be purchased for one dollar in large cities in the United States as of August 15, 1939. The items in the list were restricted to those for which average prices were available. A list of 9 foods was selected by eliminating those which were the most expensive sources of nutrients. From these 9 foods, after experimenting with various combinations, a diet consisting of 5 foods[2] was developed costing $39.93 per year per person. A similar diet plan as made for August 1944, with a few substitutions in the initial basic list. Its cost was $59.88.

Dr. Stigler believes that he probably did not discover the lowest cost diet possible with these foods. He also points out that since the prices used are average among cities, the lowest cost diet possible with the method would certainly be less in many cities than the cost of his diets. He also points out that a more varied diet could be provided with little increase in cost.

The Concept of Subsistence

Subsistence implies to continue to exist. To do this people not only must have a diet that will provide the nutrients needed but also one that they will eat. It would be possible with the method used by Dr. Stigler to devise a diet adequate to meet the quantitative specifications that nutritional science has established. But it can be described as a subsistence diet only if it is accepted by people. Dr. Stigler says of his diets, "No one recommends these diets

[2] Minimum cost annual diet, August 1939.

Commodity	*Quantity*	*Cost*
Wheat flour	370 lbs.	$13.33
Evaporated milk	57 cans	3.84
Cabbage	111 lbs.	4.11
Spinach	23 lbs.	1.85
Dried navy beans	285 lbs.	16.80
		$39.93

for anyone let alone everyone." Nevertheless, he compares his diets with several low-cost food plans prepared with the thought that they would be acceptable to a considerable number of Americans. It is thus of interest to inquire as to the circumstances under which a diet set up by the method used by Dr. Stigler would be accepted by a group of American consumers.

It seems highly probable that not a single family in the United States in spite of the multitude of food patterns that exist would choose anything approaching the proposed diets. If relief clients were given this diet, much of it would not be eaten and vigorous protests would probably be made. One can conceive of Americans accepting such a diet only following some disaster that cut off customary food supplies. Even then such a diet would be eaten in the quantities prescribed only after a long period of time; people would have to be starved into accepting it.

A subsistence diet useful for a short-run program must conform to two conditions: (1) Nutrients needed to provide a specified level of health and (2) foods of kind and quantity that are within the framework of customary food habits. The calculation of a diet accepted only after a period of starvation is an interesting exercise in arithmetic if one is concerned with food plans to use in current programs.

So far attention has centered on foods rather than the nutrients needed for subsistence. Dr. Stigler accepts as his yardstick the nutrient allowances recommended by the National Research Council. The use of the term "subsistence" for a diet that provides the recommended dietary allowances of the National Research Council is, however, at variance with the usual connotation of the word. The Food and Nutrition Board of the National Research Council recently defined a series of 6 "bench-mark levels" of consumption as a guide for allocating food supplies. "Emergency subsistence" was next to the lowest level and was defined as "the minimum to prevent very serious undernutrition leading to a marked increase in mortality and to grave danger of civil unrest."

Diets Recommended to Low-Income Countries by FAO

In any consideration of subsistence, it is of interest to note the targets that have been tentatively proposed by the Food and Agriculture Organization for countries with low calorie intake. These, in most cases, call for an increase in cereal consumption to raise

calorie levels, and for substantial increases in consumption of fats, pulses, fruits and vegetables, and in milk, meat, fish and eggs. The trend is in the direction of a more varied diet even though this necessitates increased quantities of relatively expensive foods.

Current Food Plans of the BHNHE

At the present time the Bureau of Human Nutrition and Home Economics distributes upon request two food plans, one at a low-cost and one at a moderate-cost level. These are used by agricultural economists as well as by nutritionists and welfare agencies. However, the major use made of these plans is to aid families in their food management.

These plans to serve their purpose must and do merge the physiological and the cultural components of diets, the practice to which Dr. Stigler takes exception on two grounds. The first is that the particular judgments of the dietitians as to the minimum palatability, variety, and prestige are at present highly personal and nonscientific and should not be presented in the guise of being parts of a scientifically determined budget. The second reason is that these cultural judgments, while they appear modest enough to government employees and even to college professors, can never be valid in such a general form. No one can say with any certainty what the cultural requirements of a particular person may be, and on the face of it will always be impossible to determine a unique cultural minimum diet for 140 million Americans.

The validity of objections to merging the physiological and cultural component should be judged in the light of methods used.

The current method of developing the low-cost food plan of the Bureau of Human Nutrition and Home Economics is as follows: (1) The starting point is the food consumption of families with small expenditures for food. (2) The nutrients in the average diet for these families taking into account cooking losses[3] are compared with the recommended allowances of the National Research Council. (3) Estimates of the cost of nutrients from various foods are examined and adjustments made in the quantities of selected foods so that dietary allowances are met and costs minimized. At the same time marked departures from customary consumption are avoided.

[3] These are especially important for vitamin C much of which may be destroyed, for example, in the cooking of vegetables. The estimates used for taking account of such losses are, so far, unpublished.

The diets do not prescribe quantities of specific foods but quantities of groups of foods. Foods grouped together are similar in composition or serve much the same purpose in the menu. This is important in making them flexible and adaptable. Flexibility as to cost is achieved by directing the attention of families to the least expensive foods within the broad groups and what they can have if higher expenditures are feasible.

No one is likely to contend that "low" with respect to the cost of a diet is a precise concept any more than with respect to income. "Low" for the cost of the diet as well as the income is a relative matter. Using the general method described above, several plausible low-cost diets could be developed, selecting somewhat lower or even higher costs as the base point of the diet and making suitable adjustments in the quantities of the various foods on the basis of their relative cost. Hence in preparing any low-cost food plan, its relative usefulness has to be considered in contrast with that at other cost levels.

The current method of developing the moderate-cost food plan differs in the cost level of family food consumption used as the starting point and in the attention given to minimizing cost when adjustments are made in the food to supply the recommended allowances of the National Research Council.

There are a multitude of food patterns in the United States. Thus the usefulness of the plans as a guide is perhaps greatest for families whose habits are similar to average food consumption as measured by the major food groups. Although the requests received attest to the large number of such families, there is need for additional food plans that give guidance to families with food patterns quite different from the average even when measured in terms of broad food groups.

Other Methods of Developing Low-Cost Food Plans

Food plans are primarily intended as guides to families. The low-cost food plan has also been used, however, as a yardstick for estimating adequacy of income. For such a purpose, food plans developed by the method described above have been criticized on two sources: (1) The money allowed for food on this basis is too limited. The plans have been prepared by experts, who with economy in mind, have used their knowledge of what foods give the best nutritive returns for the money. (2) The food plans are not objective.

The low-cost food plan rests basically on the food pattern of a group of families selected with reference to level of expenditures, the selection of the level being made by those setting up the diet. Furthermore the modification of the food pattern at this level selected depends on the emphasis given to economy and the decision as to how far one can depart from customary patterns and still have a useful food plan. To adjust the low-cost food plan so as to allow for difference between experts and housewives, an allowance has sometimes been added to the expenditures considered necessary to purchase the foods prescribed. Other methods could be used to meet one or both the criticisms stated above.

Food plans could be formulated by isolating family diets that provide recommended amounts of nutrients, arraying them by cost levels and averaging the quantities of food consumed at the lowest cost level. The diets then would be altogether based on the practices of families. They would have no deficiencies but might have greater excess in some nutrients than are provided in the current low-cost food plan. Such a food plan would still be subject to the criticisms that the cost level would be the result of a decision of the investigator. In addition it might not have the same educational value as the low-cost food plan of the Bureau of Human Nutrition and Home Economics since it does not pass on to the housewife guidance from experts.

Certain methods are also feasible for increasing the objectivity of the method used in developing a low-cost food plan and at the same time staying within what might be looked upon as an American consumption pattern. A food plan could be developed by a multiple correlation of foods in relation to nutrients using food consumption data as reported by families. The restriction on cost might be limited to providing only the quantities of nutrients in the recommended allowances of the National Research Council except for necessary excesses of some nutrients in order to stay within the American pattern of food habits while providing at least the recommended allowance of all nutrients. In addition diets from a random sample of families might be selected that minimize the excess of nutrients and yet provide at least the recommended dietary allowances of the National Research Council or some other yardstick of adequacy. There is no reason to suppose, however, that such food plans will be more valuable as a guide to families in

their choice of foods than the current low-cost food plans of the Bureau of Human Nutrition and Home Economics.

Need for a Critical Approach to Low-Cost Food Plans

There is no escaping the merging of the physiological and cultural components of diets for those who wish to prepare plans that are useful as guides to families in their choice of foods or to administrators in gauging food allowances needed to provide a given standard of consumption for a special group or for the entire population. This is true even when the standard of consumption is subsistence. Beyond being an entertaining exercise in arithmetic, Dr. Stigler's estimate of a subsistence diet is a challenge to the inclusion of relatively expensive foods in so-called low-cost or subsistence plans when families with a little education would be willing to accept the lower cost foods.

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BOOK REVIEWS

Forward Prices for Agriculture, D. Gale Johnson. University of Chicago Press, 1947. Pp. xi, 253. $3.00.

This book cannot accurately be described as exposition or defense of the special status of the farm economy. Parity-price or income and associated interventionist devices are renounced as techniques for income-transfers. The strategic importance of stable and high level non-agricultural employment is stressed and no one-dimensional plan for economic salvation is offered. However, there is implicit but pervasive assumption that the farm population may properly press special social, economic and moral claims upon the rest of the economy.

Two broad proposals are made. First, farmers would be relieved of the necessity to estimate in advance of initiating production the prices which would prevail through subsequent market periods. Such estimates would be made by government officers operating within some very broad policy enunciated by the Congress. Where gestation or life of capital is long, less precise estimates would be assured for several production periods. Price-quantity schedules would be published for perishables, so arranged that some specified average income per acre could be assured regardless of yields. These guaranteed prices would be estimates of industry equilibria-prices. The quantity which the officials believed would be produced by free response to the guaranteed farm price would also be the quantity which they believed would move into market or other desired channels at that price. If either prediction failed to materialize, market prices would be allowed to change freely except as affected by storage or other collateral programs. If the announced estimate were less than the realized market price, the difference would be transferred to farm producers. Second, at the onset of unemployment in excess of five to six percent for at least six months, these advance guarantees would be adjusted to assure receipt by farmers of at least seventy-five percent of pre-depression income. In addition, some minimum family allowance to farmers would be also assured.

To function effectively, Dr. Johnson holds that price guarantees must be sustained from well in advance of planning production through the regular marketing period. A full range of prices covering major products and related commodities, adjusted for grade or

location differentials, must be published. Farmers must be persuaded to alter their preference for "earned" incomes over subsidy. Administrators must be competent and strong against pressure. Significant reduction of instability in general price-levels and in employment is also held to be necessary if forward prices are to reduce price-uncertainty. Granted these conditions, it is stated that forward prices will contribute more to efficiency of resource-allocation, to stability in output and employment and to equality of economic opportunity than either market prices or any other interventionist price policy. Maintenance of high-level non-farm employment is also required.

Policy is defined by three attributes: The goal-context or desired economic situation; the factors in terms of which the discrepancy between the actual and the goal-economy may be explained; and the administrative techniques by which these factors may be manipulated in order to cause the actual economy more closely to approximate the goal-situation.

Six basic goals are enunciated—two resource-objectives and four income-objectives. First, resources are held to be most effectively allocated when realized marginal revenue products equal wages of productive factors and either equal or exceed marginal revenue products in alternative uses, provided consumers are reasonably free in earning and disposing of their incomes. Second, some positive rate of net capital formation is held to be desirable but no effort is made to formulate quantitative indices for its definition. These four income-goals are held to be generally accepted: first, a minimum plane of living defined in terms of minimum money outlay on nutrition and provision of minimum public services; second, some unspecified degree of equalization for personal incomes; third, equalization of incomes to members of various occupational, racial or geographic groups; fourth, dampening of general and individual income-fluctuations, which again is not quantitatively defined. The book is an argument that administrative intervention, through advance price guarantees would cause resource-allocation and income-distribution to conform more closely to these very loosely-specified norms which would be goals, guides and checks for the administrators.

Dr. Johnson holds that prices can be used as devices to alter resource-allocation either by decreasing price uncertainty or by transferring its burden from farmers to the general public. They

can be used, he says, to obtain income-goals only in conjunction with extra-price-system devices of which the most important are measures to equalize human productivities. It is stated that uncertainty with respect to the prices of productive resources and their products and to the production function itself preclude maximum-profit adjustments in combinations of factors or in scale, in diversification, flexibility and liquidity of the firm, and in amount and kinds of capital equipment. Fear of fixed cash-commitments and inability to obtain capital in amounts or upon terms which would equalize its marginal efficiency and cost lead to excessive labor and short-term capital components in production and to uneconomical scale or methods of production. The gestation and life of some farm capital are long and the farm production-function is rarely known. Neither price nor yield nor even money costs of productive factors can be precisely predicted and the farm entrepreneur must gamble with little help from price in making his production-decisions. Assuming that future price-situations will resemble but not replicate past situations, he can project present prices, some trend or average of past prices variously weighted, or he can use statistical forecasting techniques. Effectively, farmers can either project current prices, or counter their production plans to those of competitors or disregard price and work on a fixed program. Forward prices, the author asserts, would make it possible so to allocate resources as to equalize their marginal revenue products and costs. Conceptually, this would be an optimum-profit adjustment, although it is hardly an effective working guide.

Dr. Johnson concedes that inter-industry disparities in earnings will not be lessened by forward-pricing in farming. This would require the maintenance of high-level employment and the acceleration of farm emigration. Price policy is discounted as a means of obtaining any of the income-goals. Reduction of farm price-uncertainty does not touch the roots of the problems of minimum planes of living, of gross personal inequalities or inter-industry disparities in incomes. Price control can make only a minor contribution to stabilizing incomes over time. Thus Dr. Johnson demonstrates that forward prices make no significant contribution to four of his goals and he makes no reference to a fifth. A declared enhancement of internal firm efficiency through long-run guarantees appears to be the single desirable result of the proposal. The author quite properly holds that a policy of this sort must be appraised in terms of gen-

erally accepted goals the consummation of which would create a more desirable economy. But then he demonstrates most effectively that forward prices will make little if any contribution to five of the goals because price-uncertainty in agriculture is not in fact a major cause of the major ills of the American economy. This is an excellent analysis of the major issues involved in the forward pricing scheme. It is also a persuasive demonstration that the benefits of this scheme may not be worth their cost to farmers and to the nonagricultural population.

The author concludes that forward pricing is consistent or complementary with monetary-fiscal operations intended to stabilize general price levels and employment and with commodity currency schemes. Little benefit either from the latter or from forward contracts or futures operations is foreseen. Support prices tied to parity are rejected on standard bases. Income payments are called a second line defense which is of no aid in obtaining more desirable resource-allocation within agriculture or between industries. Production control and export dumping are rejected. Direct subsidies are considered a necessary collateral activity of government.

Long-run certainty must be achieved if optimum labor and capital components and scale are to emerge from this proposed device. Either long-run guarantees must be "fanned out" or the rest of the population will bear the cost of an inflexible and subsidized agriculture in which superficial internal efficiency conflicts with economy-wide interests since guaranteed prices may not reflect current demands.

A "theory" of storage is formulated from a model economy constrained by a few unreal and arbitrarily assumed attributes. Assumptions that time preferences are known, that market demand—presumably as aggregates of individual quantity-marginal utility equilibria—is an indicator of total utility, that the characteristics of total utility or consumer surplus functions are known are gratuitous. These constructs thus far have no operational reality. Conclusions derived from their manipulation may or may not be logically valid. They are not empirically verifiable, they do not constitute a theory so much as an exercise in arithmetic and they are a most dangerous basis for policy recommendations.

Various practical issues of administration are also considered. On the basis of past yields, it is considered that a storage program will be relatively cheap if used to implement forward prices for major

crops. The very difficult problems of time periods and of related commodities are set out in detail. Dr. Johnson notes that forecasts of equilibria-prices need not be accurate, in order to obtain internal efficiency-benefits, overlooking that consumers will suffer to the degree that the forecast price differs from the realized price and farmers adjust to the forecast price.

Price policy is held to be secondary to attacks on the business cycle. Stabilization of net farm income in the downswing phase of the cycle is justified as inducing long-run investment, decreasing individual hardship, maintaining demand and increasing labor mobility.

Dr. Johnson demonstrates that price certainty will not lead to income certainty when producers are chronically afflicted by violent fluctuations in output. Individual incomes would not be stabilized by stabilization of aggregate incomes.

Finally, the really significant issues are posed. It is admitted that administrative authority would be extended, but it is held that stability is needed if individual enterprise is to endure. It is admitted that administration would involve great and perhaps insurmountable difficulties.

This is a significant work. It engages genuinely important problems. It is honest. The craftsmanship is of a high order. Dr. Johnson knows the tools of his trade.

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Farm Management, J. D. Black, M. Clawson, C. R. Sayre, and W. W. Wilcox. The Macmillan Company, 1947. Pp. xii, 1073. $5.50.

This text is definitely an economist's approach to the field of farming. Yet while the basic discussion is built on economic principles, the authors have made liberal use of related natural sciences and have succeeded rather well in integrating them all. The approach is a broad one in the sense that the authors not only consider the farm as such but also the setting in which the farm operates and the interrelationship between the two. To make the text more fully usable in some farm management courses, as they are now being taught, may require not only adaptation of the text to the course but of the course to the text. Institutions that offer production economics as a separate course might find it necessary to more closely integrate their courses.

The authors have done a real service in adequately bridging the gap between the general and abstract body of principles of economics and their application to problems of farm management. In so doing, they have emphasized methods of analysis that consider the farm as a whole and thus minimize the possibility of erroneous conclusions that result from only partial analysis. This emphasis is highly worth while.

To anyone who is thoroughly familiar with the senior author's earlier book, *Production Economics* (1926), this textbook is intensely interesting. Many of the same economic principles are dealt with in both books. However, the wealth of illustrative material in the field of agriculture available to the authors in this book contrasted with the earlier one not only shows the results of 20 years of progress in the field but indicates the influence that the authors have had in guiding research during this period.

The book is divided into six parts containing forty-eight chapters. Part One entitled "Introduction" is an orientation section. Part Two deals with the management problems of different systems of farming. This section is a skillful interweaving of management problems and the management principles involved, largely using actual studies as a vehicle to carry the discussion. It begins with a relatively simple case of a one-crop farm and gradually introduces more complicated situations and the accompanying principles. Part Three takes up principles and methods of analysis. Principles woven into the earlier discussion are generalized and their treatment expanded. Parts of this section will be repetition to anyone who has had previous work in production economics. The section also deals with measures of success and factors in success in farming. This may prove to be a controversial section among prospective users of the text.

Part Four deals with a wide range of management problems. The varied nature can be seen in the following partial list: management of labor, land, equipment; farm planning; land valuation and buying or renting; financing; buying and selling; role of public agencies in farm management.

Part Five deals with management by types of farming and Part Six takes up a discussion of agriculture in the economy of the nation. This section deals in summary fashion with such problems as the interdependence of agriculture and other production; de-

pendence on foreign markets, what shall the nation produce and national agricultural programs.

Whether it be as a text or for reference this book contains a great deal of material that every student of farm production and farm management ought to know. The book is long and contains much descriptive material which may prove uninteresting, but interwoven throughout is a solid body of principles and analysis that makes the effort highly worth while.

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A Second Review

This book contains information on a wide range of subjects—far wider than the title indicates. As such it can be a useful reference. It is written in an understandable and readable manner.

The book is divided into six parts:—Introduction, Systems of Farming, Principles and Methods of Analysis, Problems of Management, Management of Types of Farming, Finale. Part Five, Management by Types of Farming—is really a continuation of part two, Systems of Farming. Thus, 480 pages of the book are devoted to a discussion of various systems of farming.

The discussion of principles and methods of analysis would leave a student with few definite ideas as to how to proceed. Much of the discussion in this section was a apparently written for an argument with other workers in the field rather than to inform a student who is new in the field. The following statement at the end of the chapter on "Measures of Success and Factors in Success in Farming" is typical:—"Standards of good performance therefore really need to be adapted to the particular circumstances on each farm. Farm management extension workers who make use of such standards are ordinarily in a position to make such adaptations, at least in rough-and-ready form." Thus the conclusion which the student finds is that each farm must be analyzed differently and that the extension worker knows how to do it.

The first sentence in the preface reads "This textbook is intended primarily for use in the junior and senior years in agricultural colleges." For this purpose the book suffers from a lack of care in selecting the subject matter. In places so-called technical matters are passed over, such as the following statement in the one para-

graph on disease control and mortality in poultry:—"The technical procedures by which such control is achieved are outside the scope of this book" (p. 945). The technical information concerning the balancing of the ration for winter egg-laying is apparently within the scope of the book (pp. 935–936), as is the information that in producing broomcorn "—the heads should be threshed on the same day as gathered, and the brush placed on shelves in a special curing shed" (p. 849).

Throughout the book, the problems of the individual farmer as a business manager are intermixed with the economic problems of the nation. The final chapter on Agriculture in the National Economy discusses some of the public problems of agriculture. The reason for including this in a text on Farm Management is indicated in the preface. "The students of this generation have immeasurably widened their horizons. Many of them have seen farming vastly different from what they had known before. They ask why it is so different. They ask to see the farmer they have known in a larger perspective." This reviewer is in complete accord with the broad educational program indicated for these students. He would question whether it can be attained by attempting to cover everything in one course. It can be better attained by a selection of courses, each handling one area of knowledge in detail, so that the student will have depth as well as breadth in his training.

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America's Needs and Resources, by J. Frederick Dewhurst and Associates. The Twentieth Century Fund. 1947. Pp. xii, 812.

This survey of "*America's Needs and Resources*," by the Twentieth Century Fund provides both a detailed analysis of past trends of the American economy and a careful projection of what can be achieved with continuous high-level utilization of our resources and labor force. The wealth of detail on the separate sectors of the economy and the over-all estimates represent the product of several years research by an outstanding group of technicians.

The volume begins with an analysis of basic trends in the economy and contains a special section on the influence of the wartime developments. But the treatment is essentially forward looking, developing trends and projections of output, population, and income-expenditure-saving patterns.

The major portion of the book is devoted to an analysis of gross national product and its components in the three major categories. Consumer requirements are dealt with in 9 broad groups containing comparisons of needs and demands. Capital requirements are analyzed on an over-all basis and special attention is directed toward the need of urban development and of rural and regional programs.

Completing the survey of gross national product is an analysis of Government expenditures and foreign transactions. Finally, then, the authors are ready for a comparison of America's resources, both human and natural, with productive capacity. Productive capacity is analyzed first in the industrial sector and then in the agricultural. This latter chapter written by Dr. Louis Bean will be of special interest to agricultural economists.

As the authors have suggested, the trend of productivity provides a key to the future of the economy operating under conditions of reasonably full employment. The estimates of production are based on a rise in output of 18 percent per man hour between 1940 and 1950 and a similar rise between 1950 and 1960. This is the average rise which occurred during the 9 decades between 1850 and 1940, but far below the increase between 1920 and 1940.

The estimate of total production in 1950, as measured by gross national product adjusted for price changes, is 10 percent less than at the peak of the war effort in 1944, but is considerably above the previous prewar peak in 1941. The total is just twice as large as that produced in the corresponding year (1924) following World War I.

A simple method of showing the general characteristics of the economy as projected in 1950 is to compare it with 1947, a year which is now fresh in everyone's memory. Total labor force is estimated to be about the same as or a little higher than in 1947. Reflecting a moderate rise in unemployment, the total number employed is slightly less than that of 1947. The gross national product, however, adjusted for changes in prices is from 3 to 4 percent higher, the result of a very modest rise in productivity.

In each of these categories, unfortunately, the projections for 1950 and 1960 cannot be compared directly with current estimates because of substantial revisions in these series since publication of the Twentieth Century Fund Survey in May of 1947. For example, the 1944 estimate of the labor force has been revised upward by about 2 million, and current estimates from the Census are now on this higher basis. The revised estimates of GNP, which appeared

in a special supplement to the *Survey of Current Business*, July 1947, represent basic changes in concepts as well as statistical changes. The effect of these two types of changes on the 1944 estimate of GNP was to increase the figure from $198 billion to $211 billion. Thus the familiar figures of 60 million workers and $200 billion GNP as used in this volume are more nearly 62 million and $215 billion in terms of current estimates.

Throughout the work the emphasis placed upon past trends and developments results in a valuable analysis which for all its breadth of scope is replete with details. The various sections, which are signed by the individuals who wrote them, are handled by competent experts.

Although the volume is written so that it can be read by those without technical economic training, it is not light reading. In the text are more than 300 tables and only 37 charts. Additional charts would have made it possible for the casual reader or the non-specialist to grasp the principal ideas more readily. The details shown, however, are particularly valuable for the specialist, and they are supplemented by 100 pages of Appendix. In addition, the methods used and the bases for the projections are set forth clearly, facilitating checking the estimates and varying the assumptions used to suit other purposes, as is always necessary in subsequent studies. *America's Needs and Resources*, represents an approach to the full employment problem that is valuable both for governmental economic planning and for individual business planning. It is an important source book for economists.

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Marketing, an Institutional Approach, Edward A. Duddy and David A. Revzan, New York: McGraw-Hill Book Co., 1947. Pp. 661. $4.50.

The authors, who have made many extensive contributions in the field of marketing through their research, teaching, and writing present a new marketing text. In many respects this book conforms to a pattern which has become fairly well established for general marketing texts. It is large, containing 663 pages. It contains of necessity much descriptive material of marketing institutions and their operation. Its organization, which begins with a discussion of marketing functions, includes the usual sections on marketing

organizations, prices and price policies, government regulation, marketing costs, and an appraisal of our marketing system. In other aspects, the authors have departed from the beaten path to examine some of the socio-economic forces and relationships which influence the organization, operation, and development of marketing institutions.

The institutional approach to the study of marketing is not a new one and the authors frankly claim no originality in using it. Their ambition in preparing this textbook has been "to get the student to think of the marketing structure as an organic whole made up of interrelated parts, subject to growth and change and functioning in a process of distribution that is coordinated by economic and social forces." This is indeed a noble ambition and the authors, by expanding the institutional approach, have made a contribution toward this objective. One of the most difficult problems which business men, economic planners, and others face in making individual and collective decisions is to distinguish with some certainty between the logical and practical consequences of their decisions. To the extent that these decisions apply to marketing problems, the individuals concerned will need a practical and well-rounded knowledge of the why and how of transactions in the market place. Several chapters in this book add another "stepping stone" to the literature which may be helpful to many students, both young and old, in the analysis of marketing problems.

The book consists of six parts. The first three parts present in somewhat traditional manner an analysis of marketing functions, retail markets, and wholesale markets. Emphasis is placed upon the functional activity and structural organization of the marketing agencies. Agricultural economists will be particularly interested in Chapters 17 though 20 which discuss the marketing of farm products. Much of the analysis is done on a commodity basis and it should prove useful to marketing teachers for that reason. While the chapter on cooperatives covers the many types of this organization, it is a bit disappointing in that it fails to appraise the institutional significance of the whole producer movement in agriculture. Certainly this job needs to be done if we are to understand fully the forces at work which influence our marketing institutions. The chapter on future trading will help clarify many points for the student who struggles through this great mystery. The discussion of this important subject is still too technical in the opinion of the

reviewer. The use of additional illustrative material would improve its usefulness to the student.

The major contribution of the authors will be found in the last three parts of the volume. The busy reader will find Parts IV and V of particular interest. Part IV presents an appraisal of the area structure of retail and wholesale markets and how they are or may be determined. This section brings together some practical and useful material. Part V deals with "Price Structures" which includes chapters on Prices and Price Structures, Price Policies, and Structural Change. The chapter on structural change seems out of place in this section. It relates not only to price structures but also to market area structures and to market institutions. Perhaps the more important consideration is that the authors, in their wisdom, included it in their analysis. This subject has been examined rather superficially in many marketing books and this treatment has represented a weakness in them. For example, the authors' discussion of "Forces Making For Change" is good as far as it goes. It is too abbreviated in the opinion of this reviewer. It seems that an analysis of the impact of technology and other factors upon our marketing system deserves a more intensive analysis than is given to it in this and other chapters.

The authors attempt to pull together the various parts of the marketing system into an "organic whole" in the last part of the book where they examined the coordinating forces. For example, Chapter 27 discusses the Role of Management as one of these forces. Recognition of the place of and the importance of management adds a practical flavor to this book.

Any reviewer of a book can find many statements with which he may disagree. This book is certainly no exception to the rule. The major weaknesses seem to be these. The student is likely to have difficulty in assimilating a body of principles which are necessary in the analysis of marketing problems. There seems to be a tendency in many current marketing textbooks to neglect the stating of principles or "rules." We are expecting too much of the average college student when we assume that our pearls of wisdom are as meaningful and clear-cut to him as they are to us. The discussion of prices and price policies failed to give adequate analysis of the institutional significance of price control such as was experienced under the OPA. Much has been written on this subject and its omission leaves a gap which needs attention. Finally, the subject of processing is given a relatively minor treatment, particularly as

it affects farm products. It is a service performed by marketing organizations which has done much to influence the nature of marketing.

This text is well written and the statements made have been thought through with considerable care. It appears to be readily adaptable for teaching purposes since each chapter is complete within itself. Hence, the instructor can select chapters in any sequence which suits his individual preference. The authors deserve much credit for contributing this extensive volume to the growing body of marketing literature. It is a good book which will be read with interest by many people, particularly as a general marketing text.

G. B. WOOD

Purdue University

History of Agriculture in Ontario 1613–1880. R. L. Jones, Toronto, The University of Toronto Press, 1946. Pp. xvi, 420. $4.25.

Professor Jones' careful chronicle of the beginnings and growth of agriculture in Ontario during the greater part of three centuries fills a gap in the history of Canadian agriculture. He has provided a study of the development of agriculture in Ontario which is, in some ways, comparable to that done for the Canadian Prairie Provinces by Morton and Martin in their *History of Prairie Settlement and Dominion Lands Policy.*

For purposes of analysis Dr. Jones subdivides the three centuries which he has covered into five periods. In the first of these, the pre-Loyalist era, agriculture was confined to the corn growing of the Huron and Algonkin tribes. The beginning of the "pioneer period" is roughly identified with the coming of the Loyalists from the American Colonies at the time of the Revolutionary War. Although wheat was becoming the principal cash crop, a high degree of self-sufficiency and barter together with a lack of schools, churches and roads, were characteristic of the pioneer economy. However, by 1812 the Niagara Peninsula and the areas bordering the Lakes had lost much of their pioneer rawness as farms were developed, roads and ports completed.

The agricultural economy of the third period was built around the production and sale of wheat. Although wheat was found in the older areas in the early eighteen hundreds, it became the most popular crop throughout the settled areas of the province in the eighteen-thirties and early forties. This development marks the

beginning of a long continued dependence of Canadian farmers upon an export market for their products.

Two factors combined to lessen the dependence on wheat in the eighteen-forties. The first of these was the repeal of the British Corn Laws; the second the high prices in the United States which accompanied the construction of railways and the discovery of gold. Higher prices opened up the American market in spite of the tariff. The removal of duties on Canadian farm products under the Reciprocity Treaty of 1854 lent further impetus to the trend away from wheat and towards livestock products.

The fifth period, that between 1866 and 1880, was "one of adjustment to the changes resulting from the abrogation of the Reciprocity Treaty and to world-wide competition in the European market." The suitability of newly settled lands in the American mid-west to the growing of wheat was undermining the comparative advantage of wheat as the principal cash crop in Ontario. As early as 1866 barley was well on its way to displacing wheat as the staple cash crop of Upper Canada. By 1880 nearly all of the land suitable for cultivation had been brought under the plow. The expansion of factory cheese making for the British market, the beginning of creamery butter production, the opening of the British market for beef cattle and sheep, and the development of fruit growing served to attract resources which had been devoted to the production of wheat.

Agricultural history provides a backdrop which is helpful to the agricultural economist in evaluating current problems. This book presents a panorama of the progress of the agricultural industry of Ontario. The most impressive characteristic of the history of the industry during the nineteenth century was change. Barley replaced wheat as the staple cash crop, the "naked summerfallow" was eliminated from the rotation while milk sold to cheese factories and creameries became an important source of farm income. Revolutionary improvements in farm machinery were effected.

Organized markets in many parts of the Province were, during the first quarter of the century, non-existent simply because there were no roads sufficiently good to permit collection of products. Packing plants were established at Hamilton and Toronto around 1855. The description of their operations has a modern ring. "Most of these packing plants packed both the fat mess pork and lean pork. The mess pork was liked in the British North American provinces, especially among the lumberman, but the British con-

sumer insisted upon a much leaner pork, which was produced from comparatively small hogs, that is, those weighing about 220 pounds."

By analyzing an immense array of primary and secondary material, Professor Jones has traced the settlement process in "Upper Canada," the changing farm technology, the shifting markets for farm products and the continual improvement in the living standards of farm people. In these respects his book is excellent. A map showing counties, canals, railways and the more important towns and cities would have proved very helpful to the reader who is not intimately acquainted with the geographical details of the province.

The agricultural economist would have been appreciative of a fuller treatment of the changing relation of the agricultural industry to other industries and to the development of the economy as a whole. The historian cannot be a mere chronicler of events. There are far too many, and in isolation they are meaningless. Selection is essential and in this process a subjective element is inevitably introduced. Nevertheless from the vantage point of a later period in time the historian must seek "the underlying unity" of the events which he records. In this respect Professor Jones' book is inadequate.

Professor Fowke in his *Canadian Agricultural Policy* has advanced the hypothesis (in reality a thesis) that "Canadian agriculture over the centuries has been an instrument of commercial and political empire." While the present reviewer feels that this interpretation is too narrow, he is in full agreement with Professor Fowke's "functional analysis" of agricultural development in terms of the wider political and economic setting from which it derives its meaning. Useful as Professor Jones' book will prove, its usefulness could have been enhanced had he tied his study of the development of the agricultural industry more closely to that of the province as a whole.

G. L. BURTON

Macdonald College of McGill University

Modern Farm Management: Principles and Practices. Andrew Boss and George A. Pond. St. Paul: Itasca Press, The Webb Publishing Company, 1947. Pp. xi, 494. $5.00.

Workers in farm management and agriculture in general should find this book of interest, not only because of its value as a text,

but also because of the long and broad experience of the authors. The senior author's death occurred before the publication of the book but not before he had read the galley proof. According to his obituary, which appeared in the February 1947 issue of this Journal, he had rounded out more than 40 years of teaching in the School and College of Agriculture and the Graduate School of the University of Minnesota at the time of his official retirement in 1936. He was called back to active duty in 1944 as Associate Director of the Experiment Station. The junior author who was his student and associate for more than 30 years states in the preface: "It was his last and most comprehensive contribution to farm management literature and summarizes the developments of a field in which he was a pioneer and to which he devoted a lifetime of service. It was, in a sense, his valedictory to the subject of his major interest and activity for nearly fifty years." These facts help to explain the practicability of the principles and practices set forth and the down-to-earth philosophy which are the outstanding characteristics of the book.

The treatise is divided into five sections: Introductory; Part I, Elements Involved in Farming; Part II, Farm Organization; Part III, Farm Operation; and Part IV, Farm Management Services and Related Problems. Also, there is a brief appendix relating to weights, measures, and mapping. Each section is treated rather fully and Part IV contains more material than is usually found on these related problems in farm management texts. While a major portion of the illustrative material is taken from Minnesota farms, the principles are generally applicable.

The introduction is concerned with the meaning, history, and development of farm management and the characteristics of farming. Probably the most useful specific definition is the following: "*Farm management* is the judicious use of all the known means of art, science and business in the scientific management of a farm or of farm properties, with a view to securing the largest possible returns in income and satisfaction." The history and development phase utilizes much of the senior author's article, "Forty Years of Farm Cost Accounting Records" which appeared in this Journal in February 1945. Other appropriate material has been incorporated. The discussion on the characteristics of farming shows an intimate and sympathetic knowledge of the farmer's life and problems.

Part I is a description of natural resources in relation to farming,

the physical and economic factors underlying the geographic distribution of types of farming and a general description of the more important areas in the United States. The section is not long but is fairly adequate for a general text in farm management.

In many ways Part II on farm organization is the most useful section of the book. Beginning with a chapter on becoming established in farming, the section is devoted to developing farm enterprises, combining these into a well rounded organization and measuring the results by the budget method. It is stated that, "The farm budget is one of the most useful planning devices available to the farm manager in setting up and checking a farm organization." With this statement, many but not all farm management workers will agree.

The farm budget is particularly well done. This might have been expected from one who has had such long experience with the development and various uses of the method as has the junior author. The illustrations of how alternative enterprises may be substituted and tested mark a strong point of this section. There is a tendency in places to distinguish between budgeting and substitution. It is doubtful if such a distinction is justified between what amounts to the use of a method in different degrees, all of which is based upon the same economic principle.

Part III, which is devoted to farm operation, contains among its ten chapters one on the human factor in farm operation and another on farm work simplification. The former gives more space to this subject than is usually found in farm management texts. The latter was prepared by Dr. S. A. Engene of the University of Minnesota. Both of these subjects are now receiving increased interest from farm management workers.

In this section, considerable space is given to factors affecting operator's labor earnings such as indexes of crop yields, pounds of butter-fat per cow, return over feed cost, productive man work units, and power, machinery and building expense. Also, the cumulative effect of such factors is illustrated. In measuring the efficiency of operation, a prominent place is given to the thermometer chart. This is an excellent description of how all these devices have been used in farm management work. A desirable addition to this section would have included more on the limitations of these factors and methods.

Part IV on farm management services and related problems will

be particularly useful to students who do not take such courses as farm accounting, farm credit, farm marketing, and cooperative marketing. The description of farm management services would be less likely to be obtained from other courses and the importance of such services well deserves the consideration given. The same might be added concerning legal matters relating to the farm business. Both farm management workers and farm operators will find this a valuable addition to farm management literature. There is some question as to whether a text so adequate in most respects should not bring out more fully the economic principles upon which much of farm management is based.

J. A. HODGES

Kansas State College

NEWS NOTES

The Annual Meeting of the American Farm Economic Association will be held at Green Lake, Wisconsin, September 13–16, 1948.

Leslie Adkinson has transferred from the Bureau of Agricultural Economics to the Soil Conservation Service with headquarters at Fort Worth, Texas.

Sidney J. Armore, formerly with the National Housing Agency, has joined the staff of the Bureau of Agricultural Economics.

Kenneth L. Bachman has returned to the Bureau of Agricultural Economics after a year of graduate study at Harvard University, and has resumed his work on farm management and costs of southern agriculture.

Antoine Banna, Worley S. Earp, and Edward Karpoff have joined the staff of the Bureau of Agricultural Economics, transferring from the Production and Marketing Administration.

Raleigh Barlowe is reporting to Michigan State College to represent the Bureau of Agricultural Economics on a cooperative study of the administration and utilization of lands in the Michigan cut-over region.

Walter Bauer, formerly Principal Agricultural Economist in the Economic and Credit Research Division, Farm Credit administration, USDA, is now with the Investment and Economic development Division, State Department.

Earl H. Bell, Social Scientist, formerly with the Bureau of Agricultural Economics, left for Warsaw, Poland, in September, where he heads the IECF (International Emergency Children's Fund) mission to that country.

Quentin Bierman, formerly with the Bureau of Agricultural Economics, has taken up work as a Marketing Specialist on the staff of the Production and Marketing Administration. He is stationed at Denver, Colorado.

William K. Bing has been appointed Associate Professor of Economics at Kansas State College. Mr. Bing formerly was Chief of the Training and Safety Section of the Personnel Division of the Production and Marketing Administration. Prior to this he was on the staff at Clemson College. He did his undergraduate work at the University of Virginia and has taken graduate work at the University of Chicago.

Kermit M. Bird, Wade F. Gregory and Reuben D. Hess have been appointed to the staff of the Department of Agricultural Economics and Rural Sociology of the Pennsylvania State College to continue the cost of milk production studies which are financed by the Pennsylvania Milk Control Commission. Part of the funds for this biennium will be devoted to a comparison of the cost account and the survey method for obtaining cost of production data.

William E. Black, Assistant Professor of Agricultural Economics at the University of Wisconsin, resigned his position to accept the managership of Cash Crops Cooperative, Inc., Madison, Wisconsin.

E. G. Byer has accepted a position as Research Specialist with the New York state temporary Commission on Agriculture.

B. A. Campbell, for the past ten years an Agricultural Economist with the Economics Division, Department of Agriculture, Ottawa, has been appointed Economist with the National Dairy Council of Canada with headquarters at Ottawa.

Wallace A. Chase has recently accepted a position in the Department of Rural Economics and Sociology at the University of Arkansas.

C. R. Creek, who has been Assistant Professor of Agricultural Economics at Massachusetts Agricultural College, has accepted a position as Associate Professor of Economics, at Colorado A & M College, where he will work on Hope-Flannagan marketing projects.

Rex F. Daly has been appointed as a cooperative agent on marketing research work at the University of Illinois. Mr. Daly had been on the staff of the Bureau of Agricultural Economics.

Joe F. Davis, formerly with the Rural Electrification Administration, has been assigned to the staff of the Bureau of Agricultural Economics for work on a study of farm electrification problems.

Joseph S. Davis, Director of the Food Research Institute of Stanford University, spent most of December with the staff of the Joint Committee on the Economic Report in Washington, D. C.

Julius Deubner, recently with the Bureau of Agricultural Economics at Berkeley, California, is now with the Farm Bureau at Berkeley.

Bogan Y. Dodoff joined the staff of the Food Research Institute of Stanford University in September. From 1935 until early 1947, Mr. Dodoff was Assistant Director of and Associate Professor in the Statistical Institute for Economic Research, State University of Sofia.

Louis J. Ducoff, in charge of farm labor work in the Bureau of Agricultural Economics, is completing his doctorate at American University and will return to the Bureau in February.

Leonard K. Elmhirst, President of the International Conference of Agricultural Economists, is visiting in the United States.

Irving F. Fellows, formerly associated with the Division of Farm Management and Costs of the Bureau of Agricultural Economics, has been appointed to the position of Associate Professor of Agricultural Economics at the University of Connecticut.

Winn Finner, Bureau of Agricultural Economics, is making a study of the marketing of dairy products. He had formerly been assigned to a study of dairy farm production.

F. W. Forster, Head of the Department of Agricultural Economics, North Carolina State College, gave a series of lectures on Farm Economic Problems at the Garrett Biblical Institute, Evanston, Illinois, during the month of August.

John C. Frey has been appointed an Instructor in Agricultural Econom ics at Iowa State College.

Arthur G. George will give full time to farm managment research at the University of Nebraska. He was connected with the University from 1926 until called to service in May, 1942.

Roy Gilcreast, Bureau of Agricultural Economics, has been assigned to work on a study of sugar beet mechanization in the Red River Valley, in cooperation with the North Dakota and the Minnesota agricultural experiment stations. His headquarters are at Fargo, North Dakota.

Robert Glasgow, a staff member of BAE, is on leave for graduate work during the academic year of 1947–48 at Harvard.

Douglas Groves has been appointed a Research Associate in Agricultural Economics at Iowa State College.

R. E. L. Greene, formerly associate professor of agricultural economics at North Carolina State College of Agriculture and Engineering, has been appointed agricultural economist at the Florida Agricultural Experiment Station, effective January 1, 1948.

Hugh Harries has joined the staff of the University of Alberta, Canada, Political Science Department.

Professor Asher Hobson has been granted a year's leave of absence from the University of Wisconsin commencing February, 1948. During the summer he plans to take a trip to several European countries.

Leo M. Hoover resigned his position with the Farmers Home Administration and accepted a position as Instructor in Agricultural Economics at Kansas State College. Mr. Hoover took his undergraduate work at Kansas State College and received his master's degree from Iowa State. He will do teaching and research in Farm Management.

Frank ImMasche was appointed to the Livestock Branch of the Production and Marketing Administration. Prior to entering the military service, Colonel ImMasche was Principal Agricultural Economist in the Economic and Credit Research division of the Farm Credit Administration, USDA.

George Andrew Jacson, Jr., a graduate of the New Mexico Agricultural

College with an M.S. at the University of Illinois, has been appointed to a full-time position to assist Professor R. A. Kelly with the regional potato marketing studies at the University of Illinois.

Einar Jensen, long in the Bureau of Agricultural Economics, is now Agricultural Attaché in Oslo, Norway. He was transferred from Berne, Switzerland, on October 1.

John P. Johansen has been appointed Associate Professor in the Department of Rural Economics at the University of Nebraska. His work will be in the field of Rural Sociology and will include both teaching and research.

Stewart Johnson, Associate Professor of Agricultural Economics at the University of Connecticut, has been granted a three month leave of absence beginning January 1, 1948. He will work full time with a technical committee designed to study factors affecting the Class I price of fluid milk produced for the New York marketing area.

J. R. S. Jorgens, formerly with the staff of the Economics Division, Dominion Department of Agriculture, Ottawa, has joined the staff of the Alberta Wheat Pool.

Elmer Kiehl, Instructor in Livestock Marketing at the University of Missouri, was recently loaned to the State Resources Board to help prepare an analysis of the economic aspects of flood control programs in the Missouri Basin.

Donald C. Kimmel has been appointed to the staff of the Department of Agricultural Economics and Rural Sociology of the Pennsylvania State College to direct a study of the agricultural development of the Pittsburgh area. This project is financed by the Allegheny Conference on Community Development and the Chamber of Commerce of Pittsburgh.

Leo L. Klasna has accepted a position in rural market research at the University of Nebraska.

Harold L. Koeller has resumed his work for the Bureau of Agricultural Economics and is stationed at Urbana, Illinois.

Joseph W. Koudele has accepted a position as Instructor in Agricultural Economics at Kansas State College. Mr. Koudele completed his work for the Master's degree at the University of Minnesota during the summer. He will conduct research in poultry and egg marketing.

Herbert Kriesel has returned to the staff of the Bureau of Agricultural Economics after a year of graduate work at the University of Chicago.

Edmond J. Lebrun, who obtained his master's degree from the University of Tennessee, joined the teaching staff of the Department of Agricultural Economics and Farm Management at the University of Maine last February. He is dividing his time between the field of rural sociology and agricultural economics.

Herschel W. Little, formerly Assistant Statistician with the Bureau of Labor Statistics, U. S. Department of Labor, has been appointed Assistant Agricultural Economist at the Florida Agricultural Experiment Station, effective January 1, 1948.

Margaret A. McNaughton, who completed a year of graduate work at the University of Chicago, has joined the Economics Division of the Dominion Department of Agriculture and will be stationed at the Divisions' office, University of Alberta. Miss NcMaughton will be engaged in studies of rural family living.

Joe H. Miller, formerly with the Civilian Production Administration, has joined the staff of the Bureau of Agricultural Economics.

Troy Mullins, formerly with the Bureau of Agricultural Economics in Washington, D. C., has recently joined the staff of the Department of Rural Economics and Sociology, University of Arkansas as a cooperative employee with this Department and the Bureau of Agricultural Economics. Full time will be devoted to a farm management analysis of the extent and effects of recent developments in mechanization of rice production in the state.

Paul E. Nelson, Jr. has been appointed a Research Associate in Agricultural Economics at Iowa State College.

A. B. Paul, who was granted his Ph.D. degree at the University of Illinois in 1947, has been appointed an Assistant Professor at that institution to work on the economics of the food processing industries.

J. R. Paulling, Extension Professor of Field Crops in the Missouri College of Agriculture, has been transferred to the Department of Agricultural Economics to devote his time to extension and research in cotton marketing. Mr. Paulling has long been an Extension Specialist in Agronomy, working chiefly with cotton both in its production and marketing aspects. He will now give his full time to research and extension in cotton marketing.

Reed A. Phillips, who has been with the Bureau of Agricultural Economics, has joined the staff of Longstreet-Abbott and Company.

John C. Redman, formerly Professor of Agricultural Economics at Western Kentucky State College, was appointed Associate Professor of Agricultural Economics at Mississippi State College on September 1, 1947, to do teaching and research primarily in farm management.

E. H. Regnier has been promoted from Assistant Professor to Associate Professor of Rural Sociology Extension at the University of Illinois.

E. R. Reilly one time member of the staff of the Department of Rural Economics, Ontario Agricultural College, and more recently on the staff of the Department of Economics and Political Science, University of Western Ontario, has now been appointed Head of the latter Department.

Lawrence A. Reuss has transferred from Washington, D. C. to Logan, Utah, where he will represent the Bureau of Agricultural Economics in preparing a land use inventory in cooperation with Dr. W. P. Thomas of the Utah State Agricultural College.

Ralph H. Rogers is now on the field staff of the Bureau of Agricultural Economics at College Station, Texas.

J. C. Rundles, who was on the staff of the old "Office of Farm Management," a predecessor of the Bureau of Agricultural Economics, has retired from the insurance business and is living in Dunedin, Florida.

George T. Schaefer, Associate Professor at South Dakota State College, has resigned as of January 1, 1948 to enter business.

Ross J. Silkett, formerly Senior Agricultural Economist in the Economic and Credit Research Division, Farm Credit Administration, USDA, has been transferred to the Agricultural Conservation Programs Branch, Production and Marketing Administration.

M. W. Slusher, Agricultural Economist, BAE, has returned to the University of Arkansas to work in cooperation with the Rural Economics Department and will devote full time to the rice study. This study is a part of the expanded research program under the Research and Marketing Act.

L. F. Stice has been promoted from Assistant Professor to Associate Professor in Agricultural Economics Extension at the University of Illinois.

J. Robert Tompkin has been appointed a Research Associate at Iowa State College.

William Van Vliet, Agricultural Economist with the Economics Division of the Dominion Department of Agriculture, Ottawa has accepted an appointment as Economist with the Department of Fisheries, Ottawa.

Cruz Venstrom is on the staff of the Farm Bureau at Berkeley, California. He was formerly with the Bureau of Agricultural Economics.

James Vermeer transferred to the Bureau of Agricultural Economics from the Farmer's Home Administration in November. He will work on farm costs and returns.

Arthur J. Walrath recently resigned his position with the Bureau of Agricultural Economics at Blacksburg, Virginia to join the staff of the New Mexico College of Agriculture and Mechanic Arts.

W. A. Wayt has been appointed as Instructor in the Department of Rural Economics, Ohio State University.

Everett C. Weitzell has transferred from the Bureau of Agricultural Economics to the office of the Administrator of the Rural Electrification Administration.

George Whitman has been appointed an Assistant Professor of Farm Management Extension at the University of Illinois. He will have responsibility for a general farm accounting and farm management project which will utilize a new simplified account book developed by the Department of Agricultural Economics. Mr. Whitman was Assistant Director of the Emergency Farm Labor Program.

Walter Wilcox, University of Wisconsin, was granted a leave of absence during the first semester of the present academic year to serve as economic consultant to the House Agricultural Committee.

Marion N. Williamson, formerly with the Bureau of Agricultural Economics, is now with the Texas Agricultural Experiment Station where he is making a study of mechanization in the production of cotton.

Homer Woodward, has been appointed Assistant Agricultural Economist in the Maine Agricultural Experiment Station, and is devoting his entire time to research in potato and apple marketing.

Robert W. Worcester has been appointed a Research Associate at Iowa State College.

E. C. Young, Dean of the Graduate School and Professor of Agricultural Economics, has been given a leave of absence from Purdue University to take a position with the temporary Commission on Agriculture in New York state as Director of Research. Dr. Young also has been appointed a member of the Advisory Council on Social Security of which Edward K. Stettinius, Jr. is Chairman.

The Agricultural economists of the state of Georgia have organized an association—The Agricultural Economics Association of Georgia. The overall objectives of this association are: 1. To appraise the potential agricultural resources of Georgia. 2. To encourage research and teaching, especially in the field of successful patterns of farming in the state of Georgia. 3. To undertake to bring about an understanding of the relationship between the economy of agriculture and the whole economy of Georgia. 4. To bring about a better understanding of the relationship of the economy of the state and that of the nation. All of the officers of the association at the present time are graduates of the University of Georgia, having majored in Agricultural Economics. They are: President—W. L. Kinney, Regional Representative of National Highway Users Conference, Washington, D. C. 1st Vice President—W. N. Downs, Agricultural Loan Officer of the First National Bank & Trust Company, Macon, Georgia. 2nd Vice President—Guy W. Firor, Jr., Head, Fire Insurance Department, Georgia Cotton Producers Association, Atlanta, Georgia. Secretary-Treasurer—W. A. King, Extension Economist, Farm Management, University of Georgia, Athens, Georgia.

ANNUAL BUSINESS MEETING
AMERICAN FARM ECONOMICS ASSOCIATION

September 10, 1947, Green Lake, Wisconsin

Report of the President, 1947

Standing Committees: For purposes of the record the standing committees for 1947 are listed below:

Auditor, M. L. Mosher

Election Tellers
F. W. Peck, Chairman
T. K. Cowden
R. J. Eggert

Library-Custodian
W. H. Glover, Chairman
Mary G. Lacey
Anne Dewees Taylor

Marketing Research
Leland Spencer, Chairman
M. T. Buchanan
George F. Dow
Harlow Halverson
Charles W. Hauck
Irwin R. Hedges
Marvin A. Schaars
F. V. Waugh
Bennett White

Meritorious Research Awards
F. V. Waugh, Chairman
J. S. Davis
W. C. Waite

Publication of Reprints
Sidney Hoos
Henry J. Keller, Jr.

Redefining Parity Price and Parity Income
H. R. Wellman, Chairman
R. J. Eggert
R. K. Froker
L. J. Norton
O. V. Wells
K. T. Wright

Special Grants
Julius Hendel, Chairman
H. B. Arthur
A. C. Hoffman

Work Simplification
L. S. Hardin, Chairman
S. A. Engene
Paul J. Findlen
R. M. Carter
L. M. Vaughan

Most of these committees have completed their assignments. It is urgently recommended, however, that the Marketing Research Committee and the Special Grants Committee be continued during 1948 with such changes of personnel as the newly elected president deems advisable.

Library-Custodian: The membership at the last annual meeting authorized the President to appoint a Library-Custodian, and to set up a consultative committee to be attached to that office. Mr. Wilbur H. Glover of the Wisconsin Historical Society was appointed Library-Custodian. The consultative committee consists of: S. W. Mendum, Bureau of Agricultural Economics, appointed for a term of four years; Sidney Hoos, University of California, appointed for a term of three years; Henry J. Keller, Jr., Rutgers University, appointed for a term of two years.

Special Advisory Committee on the 1950 Census of Agriculture: Mr. J. C. Capt, Director of the Bureau of the Census, invited the Association to appoint a representative on the Bureau of the Census' Special Advisory

Committee on the 1950 Census of Argiculture. The Executive Committee designated Mr. John F. Timmons of Iowa State College to represent the Association on this Committee.

Annual Meeting: The September 1947 annual meeting was the first to be held on a national basis at a time other than during the Christmas holidays. The shift in seasons seemed to meet with the general approval of those in attendance. There were 528 registered for room accommodations. This number established a new high in attendance. The membership by formal vote, strongly recommended that the Association meet at the same place and at approximately the same time in 1948. Acting upon these instructions reservations have been made with the Northern Baptist Assembly for a period beginning September 13, the first open date available. While a large majority of our members favor summer meetings, goodly numbers question the advisability of discontinuing joint meetings with other social science associations. Because of the prevalence of these two points of view, it seems best to consider the possibility of a combination of summer meetings and joint meetings with other organizations. Two suggestions have been made:

1) That the Association alternate between summer and winter meetings with a view to holding joint meetings the years of the winter meetings.
2) That the Association continue to hold its annual meeting during the summer, but arrange for one or a few joint sessions with other associations during their annual meetings.

If the Association decides to continue to hold its meetings during the summer, it is suggested that its fiscal year and the date of election of officers be changed to conform more conveniently with the change in the time of holding the annual meeting.

The Executive Committee is urged to consider the several questions involved in change in annual meeting dates with a view to formulating considered recommendations to the membership at its next meeting.

Publication of a Volume of Reprints: The membership at its annual meeting approved a recommendation that the Association sponsor the publication of a volume of reprints in some particular field of Argicultural Economics. Arrangements have gone forward for undertaking this work. Negotiations regarding the specific terms of a memorandum of understanding with the publishing company are now in progress.

Respectfully submitted,
ASHER HOBSON, *President*

Report of the Secretary-Treasurer for Fiscal Year Ending November 30, 1947

Membership. At the end of the fiscal year the memberships and subscriptions totaled 1,773, distributed as follows:

	1946	*1947*	*Increase*
Individual members	965	1,124	159
Junior members	79	106	27
U. S. libraries and firms	244	327	83
Foreign libraries and firms	160	205	45
Exchanges	11	11	0
Total	1,459	1,773	314

This is the largest distribution which has ever been made of the *Journal*.

There is a considerable turnover in membership and subscribers. New members and subscribers were listed as follows:

	New
Individual members	242
Junior members	62
U. S. libraries and firms	72
Foreign	93
Exchanges	0
	469

Joint memberships were recorded as follows: Western Farm Economics Association, 142; Canadian Farm Economics Society, 16. Arrangements for the latter were made toward the close of the fiscal year.

Foreign individual members were distributed as follows:

Argentina	6	Greece	1
Australia	4	Hawaii	3
Brazil	7	Holland	4
Canada	27	India	5
China	6	Lebanon	1
Colombia	3	Mexico	3
Costa Rica	1	Palestine	1
Cuba	2	Puerto Rico	2
Denmark	3	South Africa	1
Egypt	1	Sweden	2
El Salvador	1	Switzerland	3
England	5	Uruguay	1
France	2	Total	95

There are some foreign individuals and libraries which, because of exchange difficulties, find it impossible to become members or subscribers. A few of our American members pay the dues of foreign members either with or without exchange arrangements for membership in foreign societies. This is a practice which some other members might wish to adopt.

Finances. The association had a net cash income of $2,802.85. Expenses for two annual meetings were incurred during the year. Delays in investing the association's funds, consequent on the change in the secretary-treasurer, somewhat reduced the earnings on investments. At current rates of return on the present investments, the investment earnings in the 1948 fiscal year will be $1,751.50 compared to $1,073.66 in 1947. This will be equivalent to 3.57 percent of the cost to the association.

Higher costs may be anticipated in the next fiscal year because of increased costs of printing the *Journal* and expansion in the association's

services of which the major will be five issues of the *Journal* in place of four.

Operating Income and Expenses
Year Ending November 30, 1947

		1947	1946
Operating Income			
Receipts from dues	$ 8,165.24		
Back numbers sold	672.38		
Reprints sold	449.74		
Advertising sold	75.00	$ 9,362.36	$ 8,235.03
Journal printing—4 issues	$ 5,370.29		
5 reprints	781.29	6,151.58	5,194.57
Operating Expenses			
Clerical and editorial expenses			
Annual meeting expenses	$ 858.50		
Postage and wires	195.20		
Office supplies	141.79		
Best Article Award, 1946	100.00		
Back numbers purchased	46.00		
Editorial expenses	134.16		
President's expenses	90.33		
Secretary's expenses	33.10		
American Institute of Cooperation	25.00	1,624.08	1,067.63
		$ 7,775.66	$ 6,262.20
Receipts above operating expenses		1,586.70	1,972.83
Non-operating income		1,073.66	1,544.40
Sale of stocks received as dividends		142.49	
Total receipts above expenses		$ 2,802.85	$ 3,517.23

Financial Statement
December 1, 1947

Assets		
Cash	$ 5,557.08	
Stocks, market value	19,006.23	
U. S. bonds	29,040.00	
Total		$53,603.31
Adjustments in Net Worth		
Net worth, December 1, 1946	$52,646.96	
Net income, 1947	2,802.85	
Increase in value of U. S. bond	45.00	$55,494.81
Deduct		
Amortization on bonds purchased	$ 385.55	
Stock sold	86.60	
Decline value of stocks below November 30, 1946, or cost	1,419.35	$ 1,891.50
Net worth December 1, 1947		$53,603.31

Respectfully submitted,
L. J. NORTON *Secretary-Treasurer*

Report of the Auditor

In accordance with the request of the President of the American Farm Economic Association, I have examined the accounts of the Secretary-Treasurer, Professor L. J. Norton, for the year ending November 30, 1947. I found that the books were kept from December 1, 1946, to January 15, 1947, by Professor Asher Hobson, retiring secretary-treasurer. I have checked vouchers, cancelled checks, bank debit slips, and bank statements with expenses as shown in the treasurer's books and found the book statement of expenses correct.

I have checked bank deposit slips, bank credit slips, and bank statements with receipts as shown in the books and found the book statements of receipts correct. I have checked the bank balance on November 30, 1947 with the books and found them in agreement. I have inspected the stock certificates and bonds kept in a safety deposit box in the Champaign National Bank, Champaign, Illinois, and found them as stated in the treasurer's annual report.

I have checked the treasurer's annual report, as prepared by the secretary-treasurer, with the books and found them in agreement.

Respectfully submitted,
(Signed) M. L. MOSHER, *Auditor*
December 23, 1947

Report of the Editor

Volume XXIX of the *Journal* consisted of four regular issues and a separate proceedings number. The latter was issued as Part II of the November number. This marked a departure from the old policy of four issues per year, and was authorized for 1948 by vote of the Association. The holding of the annual meeting at Green Lake during the summer resulted in including the proceedings number as an extra issue in 1947 rather than to begin the practice in 1948. The Editor took this action after consultation with the Editorial Council and the Executive Committee. It resulted in a larger than usual sized volume of the *Journal* and greatly increased printing costs.

The extended annual meeting created publishing problems because of the large number of papers presented at the meeting. It was necessary to hold over some of the papers for later publication. This has created a larger than usual backlog of material for the *Journal* which it will be necessary to dispose of during the year. Costs of printing increased by approximately twenty-five percent beginning with the November issue, but the increase was known too late to alter the plans already made for that issue. At the present level of costs, it will be impossible to continue to publish a volume of the size of Volume XXIX at present subscription rates, without some subsidization of the *Journal*. However, Volume XXIX exceeded the contemplated usual size by some 300 pages, because of the inclusion of the papers of the Philadelphia meeting as well as those of the Green Lake meeting.

This year 134 persons contributed to the *Journal* in the form of articles,

discussion, notes or reviews. There were 27 contributed articles, 72 papers from the annual meetings, 13 notes and 20 reviews. The pages totaled 1548. The division of printed matter was as follows:

Issue	*Articles Including Discussions*	*Notes*	*Reviews*	*News Items*	*Annual Reports*	*Other*	*Total*
February	336	—	—	—	18	6	360
May	182	30	14	6	—	8	240
August	152	28	15	7	—	18	220
November, Part I	143	33	13	11	6	6	212
November, Part II	500	—	—	—	—	16	516
Total	1313	91	42	24	24	54	1548

The Editor wishes to acknowledge the cooperation of the Editorial Council throughout the year and the assistance of the Associate Editors. We urge the members to continue to support the *Journal* with contributions and to inform us of prospective sources of outstanding contributions.

Respectfully submitted
WARREN C. WAITE
Editor

Report of Election Tellers

We the undersigned members of the committee of election tellers do hereby certify that we have counted the ballots turned over to us by the Secretary-Treasurer, and that

1) There were a total of 544 ballots cast and counted, and that
2) the following were elected officers for the year 1948:

President—William G. Murray
First Vice-President—E. L. Butz
Second Vice-President—Harold Hedges
Secretary-Treasurer—L. J. Norton

(Signed) F. W. PECK, *Chairman*
(Signed) T. K. COWDEN
(Signed) R. J. EGGERT

Announcement

THE LIBRARY of the American Farm Economic Association is now receiving copies of the significant works of its members. The object of the Library is to maintain a complete collection of the original contribution of the Association's members and other pioneers in this field. They will be kept in a central location and made available to scholars who wish to follow the developments in this field and to others who have need of a comprehensive collection.

Members of the American Farm Economic Association are urgently requested to contribute their publications to this collection. All contributions should be bound in permanent form. All acquisitions will be acknowledged through the Journal of Farm Economics.

Send publications to

WILBUR H. GLOVER, *Library-Custodian*
305 Agricultural Hall
University of Wisconsin
MADISON 6, WISCONSIN